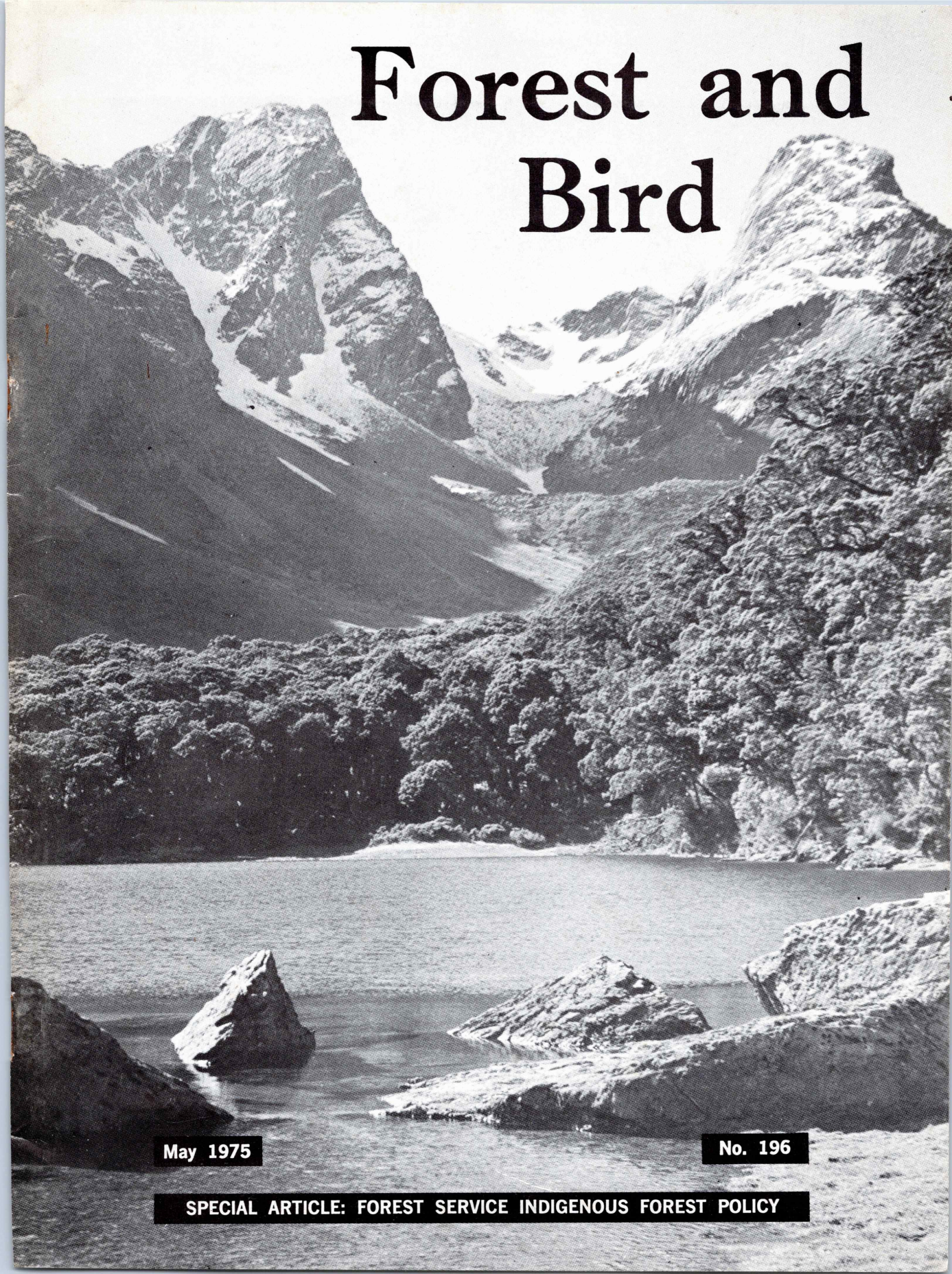


Forest and Bird



May 1975

No. 196

SPECIAL ARTICLE: FOREST SERVICE INDIGENOUS FOREST POLICY



[Ann McSweeney photo]

The spectacular Mangapohue natural bridge (over 100 ft from ceiling to stream bed) can be seen after a 15- to 20-minute walk from an AA signpost on the Waitomo Caves to Marakopa road. The hillside through which the stream runs is clothed in native bush, and the area would form a most attractive scenic reserve.

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Journal of the Royal Forest and Bird Protection
Society of New Zealand Inc.

New branches and new members

RANK and file members do not always have ready access to facts about the Society, and it will therefore be of interest to them to know that our membership now stands at about 18 000 throughout New Zealand. This figure can be only approximate, because family membership may entail a father and mother and one child or a father and mother and six children or more. The average is taken as two children, but this is almost certainly an under-estimate.

Since the last annual meeting three new sections have been started — Kapiti at Waikanae, Mana at Porirua, and South Auckland at Manurewa — and most recently a West Coast Branch began at Greymouth-Hokitika.

The Society has long been concerned at the fact that there had been no branch in two most important areas of the country: Westland, because of the beech forests controversy, and the Far North, because that area constitutes the birthplace of New Zealand and historically was occupied by Europeans well before the Treaty of Waitangi was signed in 1840.

The West Coast Branch is now an accomplished fact, and we wish it well. A Far North Branch was established at Taipa at a meeting on 22 March, with enthusiastic response from people in the Houhora, Kaitaia, and Mangonui areas. It is hoped to form a Northland Branch, based at Whangarei, later.

In numbers, therefore, the Society is progressing very well, though, as with every other endeavour, business, scientific, or recreational, difficult times are ahead financially. These will be faced by the Council and the Executive with resolution and with satisfaction to all members.

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COVER: Lake Mackenzie (Mt. Aspiring National Park), a beautiful beech-surrounded mountain lake, lies in a short valley high above the Hollyford River.
Ann McSweeney photo.

Registered at P.O. Headquarters, Wellington, as a magazine.

"MUST BE GUIDED BY PUBLIC OPINION"

Service head sets out policy for indigenous forests

A SIMPLE definition of a forest policy for New Zealand could well be: "Within our limited land surface and the increasing pressures upon it, the Government are concerned that forestry should form part of a really effective pattern of rural land use, in which it is harmonised to the best possible advantage with agriculture and the environment."—Britain's Minister of Agriculture, Fisheries and Food (1973).

THE KEY objectives are effectiveness and harmony, both of which are a matter of judgment and opinion. One hundred years or more back in New Zealand's history, the policy, or rather the accepted practice, of removing forest to make way for settlement was certainly effective and was in response to the social and economic demands of those days. If harmonious is narrowly defined as "free from dissent", this was also certainly so.

Since that time, of course, farm development has resulted in the occupation of most of the land suitable for agriculture, and in more recent years exotic afforestation has expanded at a rate where a degree of conflict has arisen. On the one hand the farming community is apprehensive over encroachment on to land already in pasture or capable of being further developed, and on the other a rising tide of opinion has been expressed against further replacement of indigenous forest with exotic species.

Utilisation of indigenous forests

Since the Forests Act 1921 the broad policy of the forest authority has been to regulate the exploitation of indigenous forests to bridge the gap until such time as the burden of timber supply could be carried by plantations of exotic species. A secondary objective has been to give time to undertake research into ways of managing the remaining resource more efficiently. The success of this consistent policy may be illus-

For study and comment

FOR the Forestry Development Conference last year Mr M. J. Conway, Director-General of Forests, prepared a statement of indigenous forest policy, of which this article is an abridgement. With the approval and co-operation of Mr Conway it is published here for careful study by all members of the Society.



Mr Conway

In the past there have frequently been differences of opinion between the Society and the Forest Service over the question of indigenous forests. Members who wish to make comments on this statement should send them to the President of the Society for passing on to the Director-General of Forests.

The indigenous forest policy statement has formed the basis of study for several of the working parties set up by the Forestry Development Council for its resumed conference this month.

trated by comparing rough-sawn timber production from both types of forest.

In 1921-22 the indigenous forests contributed 701 000 cubic metres of sawn timber, with only 26 000 cubic metres coming from plantations. In 1973-74 indigenous forest production has dropped to 381 000 cubic metres and sawn timber of exotic species has risen to 1 673 000 cubic metres. Thus, in a little over 50 years, the proportion of rough-sawn indigenous timber has declined from 96 to 19 percent of total output, and exotic production has risen from 4 to 81 percent. If total roundwood production before conversion and logs for export and smallwood for pulp and other non-sawn produce is used for comparison, the exotic forest component is now 91 percent.

Had it not been for the accurate assessment in the 1920s of the situation that obtains today and had it not been for the resolution with which afforestation policies have been pursued by successive administrations, New Zealand would almost certainly have liquidated its merchantable indigenous forests by now and would be a net importer of timber and other wood products.

In 1952 an assessment of remaining resources led to a virtual ban on exports until 1967, when the indigenous sawmilling industry was hard hit by conditions on the home market and export control was relaxed. The export of kauri is prohibited, and export of other indigenous sawn timber and logs is permitted only if they are not required for the domestic market.

Among the measures introduced in 1921 for methods of sale the most important was that the sale of timber on the basis of sawn output was replaced by measurement of standing timber even if on a sample basis. Even so, the tendency was for only the best areas to be logged and the best trees removed, and it was not until 1949 that extraction of all merchantable trees was insisted on.

Though this requirement resulted in the area of forest logged annually and over the years being reduced, it has also meant that over large areas the composition of the forest has been

drastically altered and the capacity to restore it to any semblance of its former self sharply reduced if not eliminated. Though substantial areas of forest were logged for the legitimate purpose of meeting the demand for indigenous timber, especially when exotic timber was unavailable, the subsequent use of the land itself had not been determined beforehand.

These two considerations—retention of forest structure and pre-determined or deferred optional land use—are key elements of the draft policy.

Indigenous protection forest

Nevertheless, there were vast areas of forested land in private hands, freehold or leasehold, and abuse continued. Apart from the Soil Conservation and Rivers Control Act of 1941 and subsequent legislation in that field, the major policy directive is contained in the Forests Act 1949, which placed an obligation on the Forest Service to protect State forest land with a view to water conservation and soil stabilisation. This obligation has led to every recent working plan for State forest land incorporating the recommendation of the 1969 Forestry Development Conference, which reads: "That in all areas where the need makes it applicable soil and water conservation shall be the first priority in land use."

Podocarp forest in reserve along the lower Buller River.

[Forest Service photo by J. H. Johns



An example of this was the approach of the Forest Service in its proposals for the utilisation of South Island beech forests. The very first step was to delineate and exclude all areas where, in the light of present-day knowledge, the forest should be retained for soil and water conservation.

Past policy for protection forest land has involved control of fire, control of noxious animals, research into the problems of eroded land, and, where possible, rehabilitation.

Control of fire has become more efficient with the greater co-operation of adjoining owners and of local authorities. Noxious animals, mainly deer and opossums, still pose a serious threat to our forests, and successive investigations by Government have confirmed the need for stringent measures.

The Protection Forestry Division of the Forest Research Institute, by painstakingly building up a store of fundamental knowledge and developing techniques for maintaining or restoring vegetation has, above all, highlighted the enormity of the problem in the mountain lands and the magnitude of the cost that will have to be met.

Recreation in forests

Though the main objects of management in State forest parks are soil and water conservation and development of recreational potential, under the concept of multiple use, controlled utilisation of merchantable indigenous and exotic forest is not precluded in specified zones. Such activity need not unduly detract from the recreational value of forest parks. Indeed, in somewhat similar circumstances in Britain a survey has shown that a degree of utilisation has been acceptable to those who enjoy the forest; some even found it an added attraction.

Present situation

The Forest Service has recently made an assessment, region by region, of the nature and extent of indigenous forests. Several points emerge:

The total area of forest is about 6.25 million hectares (15.4 million acres).

Of this, nearly half (48 per cent) is State forest land and one-quarter is in national parks and reserves.

Upland forest* and lowland protection forest make up 69 per cent of the total indigenous forest.

Of the remaining 31 percent, which is lowland forest comprising 1 938 000 hectares, more than a third has been logged, just over a tenth is regarded as unmerchantable, and slightly more than half (988 000 hectares) is virgin forest.

Of this virgin merchantable forest 16 percent is legally inaccessible, being in national parks and allied reserves, and a similar percentage is in private hands. The Forest Service controls 652 000 hectares or two-thirds.

More than 90 percent of the upland forest and 80 percent of the lowland protection forest is under Crown ownership in one form or another and with adequate legal authority for implementing measures to attain the objectives of soil and water conservation, with some limitations for national parks and providing for recreation. There is also ample opportunity to define and dedicate areas for scientific purposes.

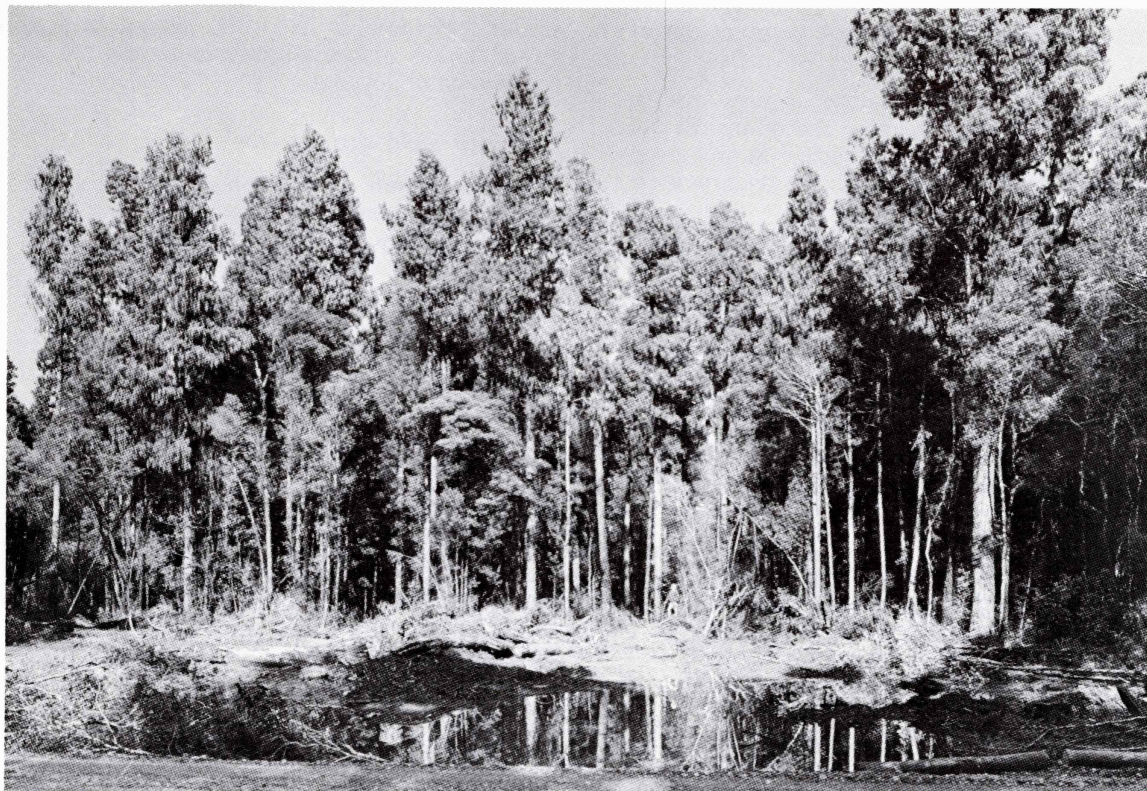
About 650 000 hectares of upland and lowland protection forest is in private hands. In view of the large area of public land already available for recreation or potentially available with better legal and physical access, the need to transfer this private land to Crown ownership for this purpose alone may be questioned, though some key acquisitions are desirable. However, it may well be asked if it is being adequately managed for soil and water conservation.

Without going into the detail of the distribution of lowland forest, it is evident that in the North Island there are some 240 000 hectares of legally available virgin merchantable forest, compared with nearly 600 000 hectares in the South Island.

In view of the disturbing situation in the North Island the Minister of Forests has endorsed the proposal of the Indigenous Forest Timber Advisory Committee that an urgent survey of available resources should be undertaken on a regional basis.

The Forest Service is responsible for nearly 3 million hectares of indigenous forest. There can be no argument as to its statutory rights and responsibilities in respect of the 2.1 million hectares of protection forest and non-merchantable forest, and there should be little doubt as to its ability or intent to manage such

*Above 2500 to 3000 ft in the North Island and 2000 ft to 2500 ft in the South Island.



[Forest Service photo by J. H. Johns

Selectively logged podocarp forest, Wanganui Forest, south Westland.

forests. For the virgin forest in its charge (652 000 hectares) and logged forest (240 000 hectares), which still carries an indigenous cover, there are similar statutory provisions, but it is in this field that public concern has been made manifest and the stewardship of the Forest Service has been questioned.

Some of the criticism has indeed been valid, but too many have ignored the dedication to their task of a succession of able administrators and professional foresters who have had a clearer insight than most into the role of indigenous forests in meeting a host of needs, including that of timber production. There have admittedly been times when policy has been formulated on an *ad hoc* basis, and in response to unanticipated pressures; if their vision has been blurred at times, so too has been the public's and the politicians'.

Indigenous forest management

It is recognised that a policy for State indigenous forests is simply a set of principles guiding the use and management of publicly

owned forests and that these principles must be based on sound forestry systems and practices, with consideration being given to the objectives and desires of the public and to economic and social welfare regionally and nationally.

It is also recognised that an indigenous forest policy should be drawn up within the framework of a general land use policy. The role of the indigenous forests in timber supply, recreation, soil and water conservation, maintenance of scenic and other less tangible values, and as a source of land for settlement or plantation forestry is significant only in relation to the extent and nature of the remaining land resource.

Indigenous forests are able to fulfil a wide range of desirable public uses. There is little conflict between alternative uses if demand for all of them is low. As demand increases conflicts will become increasingly evident, because in any given area of forest the attempt to increase one use or value will generally decrease others. Multiple use in the sense of maximising all of the uses or values in any one area of forest is thus an unattainable objective, but

management to achieve a best combination of uses is not precluded.

This optimum combination of uses can be determined only by defining the dominant use or value which is to be recognised in any given area together with acceptable secondary uses. This requires the delineation of a number of zones and the definition of intended use or uses within each.

Zonation for soil and water conservation, recreation, and preservation of scenery, flora, and fauna obviously requires the retention of the indigenous forest.

On land zoned for production the objective may be achieved by indigenous forest management or by clearing for creating farm land or exotic forests.

In view of possible loss of the exotic forest estate by fire or disease, indigenous State forest capable of production should not lightly be made legally inaccessible.

Production forest policy

Because it is virtually impossible (except by extremely costly artificial means) to restore indigenous forest once it is cleared for other productive purposes (primarily farming and exotic afforestation) the decision to clearfell should not be made before the need is clearly evident. The need to clearfell should be considered as evident only when other land in the region already devoid of indigenous forest is either unavailable or unsuitable for further development to meet Government's social and economic goals regionally and nationally.

Indigenous forests should be cleared only after a study of the social, environmental, and economic factors has demonstrated that national welfare would be enhanced by doing so. The decision on whether timber production is of greater importance than other values conflicting with such production would thus be deferred until the commitment one way or the other is necessary.

Logging of indigenous forests is thus not precluded, but as a corollary, where there is no immediate need to use the land for other productive purposes, logging should be conducted in a way that leaves open the options of maintaining an indigenous forest structure with a wide range of values or of clearing for other uses at some unspecified future time. A constraint on production in such circumstances

would therefore be that wood cannot be harvested unless a forest structure is retained or restored after logging.

Sustained yield areas

All indigenous forests zoned for production which are dominated by species yielding high-quality finishing and decorative woods, which are of sufficient extent to yield a continuous supply of such woods, and which have a structure facilitating regeneration by recognised silvicultural systems should be managed as indigenous forests for sustained yield wood production, that is, annually in perpetuity.

The cut from sustained yield indigenous forest areas would be set at the level which allows continuous and relatively even production of wood. Well-stocked cut-over forests would be included in sustained yield units. Examples of existing or proposed sustained yield units are south Westland terrace podocarp forest, West Coast red beech, and western Southland silver beech forests and kauri at a low level of production.

Periodic yield areas

Where indigenous forests of high-quality timber species with good regeneration potential are of insufficient extent for management as a sustained yield unit, the forest should be regenerated and managed to produce wood on a periodic basis in perpetuity as opposed to annually. The level of cut should continue to be governed by the aim of eking out dwindling supplies of finishing and special purpose timber. Examples are beech forest in Kaimanawa, Rangataua, and Big Bush State Forests and some podocarp forests west of Lake Taupo.

Partial logging areas

In indigenous forests zoned for production (whether previously partly logged or unlogged) but showing less promise of regenerating the dominant good-quality log and veneer-producing species by recognised silvicultural systems, and not occupying land that is needed for other productive purposes, a partial logging of merchantable trees should be practised with these objectives:

To retain a forest structure similar in species diversity to the original forest and suitable for further logging if required; to achieve a certain degree of timber production; and to leave land use options open for subsequent resolu-



[Forest Service photo by J. H. Johns

Beech regeneration in Alton Valley, Southland.

tion, for example, indigenous forest management, exotic afforestation, or farm development.

Only limited areas of this category exist, mainly in dense North Island podocarp forests and south Westland hill country podocarp forests, and they may fall within the category of periodic yield areas.

Regeneration areas

In indigenous forests (whether previously logged or unlogged) which do not contain species yielding high-quality and decorative woods, but which can be regenerated, and where the land is not required for any other productive purposes, logging should be conducted to ensure regeneration of a diverse indigenous forest.

The decision to cut such forests should be made, and the level of cut determined, after the costs and benefits have been evaluated. Examples are West Coast hard beech forests and Southland mountain beech forests.

Conversion areas

State indigenous forests should be clearfelled and converted to farm land or exotic forests only when other land in the region is either unavailable or unsuited to further development to meet Government's social and economic goals regionally or nationally.

Examples are logged podocarp-hardwood hill country forests on the West Coast and in western Southland.

Restocking of indigenous forest

Where recruitment of younger age classes is found to be inadequate in the sustained or periodic yield categories, enrichment should be carried out with nursery-raised stock or wildlings of the dominant species. This would apply particularly to kauri and beech forests.

Where natural regeneration is inadequate in the partial logging and regeneration categories and full productivity of the land is unlikely to be achieved within a reasonable time, consider-

ation should be given to supplementary planting either with indigenous species or with compatible and acceptable exotic species, broad-leaved or conifer.

Marketing and utilisation policy

The proposed policy for the management of indigenous forests is unlikely to be practicable without revising the procedures for marketing indigenous timbers and without a change in consumer preference and demand. The policy would also have to be carefully introduced and implemented to avoid a sudden reduction or cessation of supplies to existing sawmills, with undesirable social consequences.

Marketing policy and procedures should be framed to encourage milling which is efficient in maximising the recovery of finishing and decorative grades or specialised products and in using residues. They should also encourage logging practices and techniques which are economic, environmentally acceptable, and are compatible with management aims. Such practices require properly sited and well-constructed roads and methods of extraction that minimise disturbance to soil and water values. The ability to extract economically only part of the crop under carefully controlled conditions will be essential.

These logging practices will entail increased log costs, which can be met in one of two ways — by increasing the cost of logs to the processor and simultaneously raising the average price of indigenous sawn timber and veneers or by lowering the return to the State by a reduction in stumpages or log prices.

Nearly 60 percent of the current annual cut of indigenous wood is committed in long-term sales. Existing contracts will be honoured, but terms may require renegotiation to effect the changes discussed above.

Recreation policy

It is proposed that the development of national parks and State forest parks should be complementary, with pressures on national parks being relieved by strategically located State forest parks and recreation areas within easier reach of growing urban populations.

The policy for the development and administration of State forest parks has evolved over

the last 20 years. In broad terms current policy is:

- To maintain large areas predominantly in their natural condition but with provision of tracks, bridges, and huts for public access and safety.
- To recognise some areas as wildernesses, with no such provisions.
- To safeguard sites and features of special scenic or historical value and to preserve plant associations of scientific interest.
- To permit limited development of facilities for intensive public use close to forest boundaries.
- To carry out such measures as are desirable and practicable to control noxious animals and to restore a vegetative cover on eroded land, exotic species being used where necessary.
- To utilise scrub land within their boundaries for the production of exotic timber.
- To allow limited utilisation of merchantable indigenous forest.

No major changes to this policy are envisaged, except that any utilisation of indigenous forest should conform to the production forest policy outlined earlier, and that there should be greater consultation than hitherto with organisations involved in recreational use of State forests, regionally and nationally, to identify areas suitable for forest park status and to co-ordinate their management.

Protection forest policy

Protection of the forest and soil mantle to prevent the movement of debris into stream systems, with consequent stream aggradation, flooding, and loss of water quality, should be the first aim in all indigenous State forest areas.

In situations where production forestry is incompatible with the prevention of mass wasting, and the dominant use or value of the indigenous forest is thus soil and water conservation, the forest should be zoned "protection forest". This term would embrace associated sub-alpine scrub, herb fields, alpine meadows, and open mountain land.

The general aim would be achieved by protection of forests from uncontrolled fires, protection from trespass by domestic animals, and control of noxious animals.

Salient points of policy

IN BRIEF the salient points of Mr Conway's statement of policy are:

The indigenous forest policy of early New Zealand was dictated by the immediate needs of the community rather than by the requirements of the distant future. In the last half-century the major objective has been achieved of clearing forest for settlement and for development of farm land as the mainstay of the economy. There has also been created an exotic forest estate large enough to meet the bulk of our domestic demand for timber and providing a surplus for export, mainly in manufactured form.

But the growing population, slowly but surely becoming more urbanised, has come to attach to indigenous forests values which hitherto have taken second place. Formulation of a forest policy, as with any policy, must always be an evolving process, with past experience, accumulated knowledge, changed circumstances, and changing desires being taken into account. The policy presented here

has endeavoured to give more weight to this changed outlook, particularly regarding clear-felling of indigenous forest and of the need to leave open to later generations the decision on the ultimate use of productive forest land.

This shift in emphasis will bring problems to the timber industry and to some rural communities. These problems must be recognised by the urban-dominated population, who must in turn alter their preferences in wood usage and be prepared to pay the price, in more ways than one, for any decrease in output.

Finally, forest policy must be guided by public opinion, which in turn must take note of professional forestry expertise and argument. It must not be unduly influenced by pressure groups, whether they are powerful commercial interests or unrelenting preservationists. There must be appreciation of other people's points of view, a weighing up of these viewpoints, and reconciliation to arrive at a policy of effective and harmonious use of our indigenous forests.

Noxious animals should be controlled at levels dictated by correct land use and should be eradicated locally where necessary and practicable, an order of priority being followed that is dictated by the values at stake and at a rate governed by available finance. High priority should be accorded, firstly, where the prime object of management is preservation of existing native flora and fauna (that is, national parks, scenic reserves, forest sanctuaries, and State forest biological zones), and, secondly, to catchments with significant downstream values at risk.

In these high priority categories continuous and unremitting effort is needed to reduce noxious animals to levels the vegetation can safely stand and just as importantly to hold these animals indefinitely at low numbers. In certain situations local extermination will be called for. Such rigorous control is attainable only by Government measures, with the harnessing of commercial and recreation contributions where appropriate.

In lower priority areas control should be exercised by commercial operations and recreational hunting, with departmental operations being supplementary.

In certain State forests of no special biological value and where scientific evidence demonstrates that the pressure of existing

animals is not detrimental to the well-being of the land or vegetation the control of these animals should be placed in the hands of recreational hunters. However, the right should be reserved to reimpose commercial or departmental hunting if it is demonstrated that recreational hunting is not maintaining the necessary degree of control.

Responsibilities of the Commissioner for the Environment

THIS Society accepted the invitation to present a paper setting out its views on what it considered the responsibility of the Commission for the Environment should be.

The manner in which some environmental impact reports have been prepared has caused concern and the Society has stressed the importance of the commentaries on the draft reports being published in the final impact reports.

Concern has also been felt about the possibility of missing the notification of draft or published reports of interest to us and so we suggested that a weekly list of all impact reports or audits be made available to organisations and individuals.

Saving Raoul Island's native plants and birds

NESTLING in splendid isolation some 1000 kilometres north-east of Auckland lies a group of volcanic islands known as the Kermadecs. In their situation at the southern extreme of the subtropical zone they share with another and better known island, Norfolk, a similar climate, geology, bird fauna, and, to a less extent, vegetation.

**By G. E. Coster,
Wildlife Service,
Department of
Internal Affairs**

AS a group the Kermadecs consist of 13 islands, 3 large and 10 small, with two of the former being active volcanoes. Raoul, the largest of these and the largest in the group, has an area of 2910 hectares and is a complex volcano which

has erupted three times since its discovery by the French in 1793 (the latest eruption being in 1964).

During the beginning of the century which followed its discovery Raoul Island played host to representatives of that

rugged breed, the sperm whalers, and between 1837 and the Second World War several unsuccessful attempts to establish permanent settlement on the island were made.

The Kermadec group was annexed to New Zealand in



[Wildlife Service photo by D. V. Merton]

The steep, difficult terrain of Raoul Island is clearly evident in this view of Smith's Bluff from D'Arcy Point.



[Wildlife Service photo by C. R. Veltch

Understorey regeneration in a controlled area on Raoul Island.

1887 and, with the exception of a small, privately owned freehold block on the northern coast of Raoul, was gazetted as a flora and fauna reserve in 1934. In 1937 this block was bought by the Crown, which established a permanently manned radio and meteorological station on the island.

Unwise introductions

It would be pleasant to be able to report that, as a member of an island nucleus far flung and generally scornful of human attempts to tame its wildness, Raoul had remained untrammelled by "civilising" influences, a pristine haven for plant and animal life. Unfortunately, the reverse is true. Over the years man's unwise introductions of alien plants and mammals have resulted in such drastic modifications to the island's structure that if

steps had not eventually been taken to turn the tide, this island, once a rich biological treasure house, would have become a ravaged, sterile place, parsimoniously supporting only a remnant of the diversity of life it once boasted.

What, then, has happened to Raoul? To answer this in some detail it is necessary to examine the island's flora and fauna on a broad "before and after" basis.

Raoul Island, forest covered and roughly triangular, rises to 514 metres at its highest point. Most of its coastline is boulder beach, backed by cliffs up to 250 metres high, with a few sand and gravel beaches. The terrain is generally very rugged, and there is little flat land.

Of all the islands in the Kermadec group only Raoul is large enough to contain ex-

amples of every one of the approximately 20 endemic Kermadec plants. Its forest consists mainly of the Kermadec pohutukawa (*Metrosideros kermadecensis*), one of the few varieties of plant which will grow without difficulty on a bare rock surface (as well as being one of the first to establish on larva flows) and which, unfortunately, is extremely palatable to goats.

Other important species are Kermadec nikau (*Rhopalostylis cheesemanii*), karaka (*Corynocarpus laevigatus*), Kermadec ngaio (*Myoporum obscurum*), mahoe (*Melicactus ramiflorus*), and wharangi (*Melicope ternata*). Important understorey trees are *Myrsine kermadecensis* and *Ascarina lucida* var. *lanceolata*.

Much of this vegetation, which at one time was well balanced and prolific, has been and is being destroyed by feral



[Wildlife Service photo by D. V. Merton]

A botanist examines the impressive leaf area of the introduced aroid lily *Alocasia macrorrhiza*. This plant has proved a particular pest on Raoul Island.

goats, which are recorded as having been present on Raoul since at least 1836. As goat numbers increased so the seriousness of the problem compounded until in recent years regeneration of most plants and shrubs, including pohutukawa, has either ceased or become greatly reduced.

The island's understorey is already vastly changed from the time it was described by Oliver in 1910, when the endemic *Coprosma acutifolia* was recorded as being one of the commonest understorey species; it is now rare. The endemic tree ferns (*Cyathea kermadecensis* and *C. milnei*) are becoming ever scarcer, and the endemic taupata (*Coprosma petiolata*) is now very rare on Raoul. Many other endemic

plants have suffered similar reductions and one, *Hebe breviflora*, is now probably extinct.

Undesirable imports

Some native plants less attractive to goats have benefited from reduced competition, but so have several very undesirable imports, with most unwelcome results. The African olive (*Olea africana*), purple guava (*Psidium littorale*), and Mysore thorn (*Caesalpinia decapetala*) are all rapidly encroaching on the bush, and the aroid lily *Alocasia macrorrhiza*, first introduced by Niue Island workers for food, has so proliferated that it is now past the stage where eradication by any known means is possible.

This lily is worth examining in greater detail, as its presence on Raoul has had particularly insidious effects. As shown in the illustration (left), the plant has exceptionally large leaves which completely overshadow the forest floor in many parts of the island and thereby effectively reduce—and often prevent—the growth of native seedlings.

The leaf base of a large specimen holds up to half a cup of water. In itself this is not a very significant fact, but it becomes so when it is realised that there are less than a dozen obvious natural drinking places on Raoul, and yet cats are found on most parts of it, often at considerable distances from these water sources.

Though it has not yet been proved, it is suspected that the cats, which, like most carnivores, need to drink regularly, usually within a few hours of eating, can obtain moisture from the natural well formed by the larger leaf bases of the lily and have therefore been able to penetrate the more remote and formerly perhaps inaccessible waterless areas of the island. If this is indeed true, it illustrates with telling clarity the impossibility of predicting the long-term effects of alien introductions on an ecosystem.

Critical situation

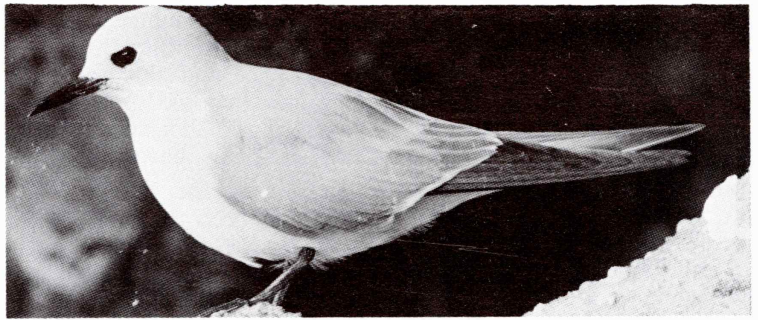
With the older, seed-bearing parent trees on Raoul now dying off, the plant regeneration being either excluded or retarded by foreign plants and goats, the present situation on the island is critical.

If the plants and goats are allowed to go their way unchecked, Raoul Island will undoubtedly soon mirror its near

neighbour Macauley Island (109 kilometres distant), where a combination of fire and goats—the latter introduced, it seems, at the same time as on Raoul—had so reduced the vegetation by 1966 that all that remained was short grassland dominated by rice grass. Before goats were almost eliminated by the Wildlife Service in 1966, their density on Macauley was 10 per hectare, and the only woody plants then surviving were ngaio and a smattering of *Kermadec taupata*.

Most of the sea bird colonies formerly established on Raoul have been almost totally destroyed by cats, Norway rats, and native rats (*kiore*). Research by Wildlife Service officers has shown that cats have preyed on eight species of petrels, shearwaters, and terns as well as on the Kermadec parakeet. The black-capped petrel, black-winged petrel, and wedgetailed shearwater once bred on Raoul in good numbers; today only the last-named of these remains and in only very small colonies. The species, however, which suffered the most dramatic decrease was the Kermadec petrel (*Pterodroma neglecta*), whose colony in its hey-day (about 1908) was estimated at half a million birds.

The young petrels were taken as "muttonbirds" by the settlers of that time (12 000 were recorded taken in one year), and the adults, whose vast numbers darkened the skies (as once did those of the now-vanished North American passenger pigeon), nested 1600 birds to the half acre. Not a single one survives on Raoul today.



[Wildlife Service photo by B. D. Bell]

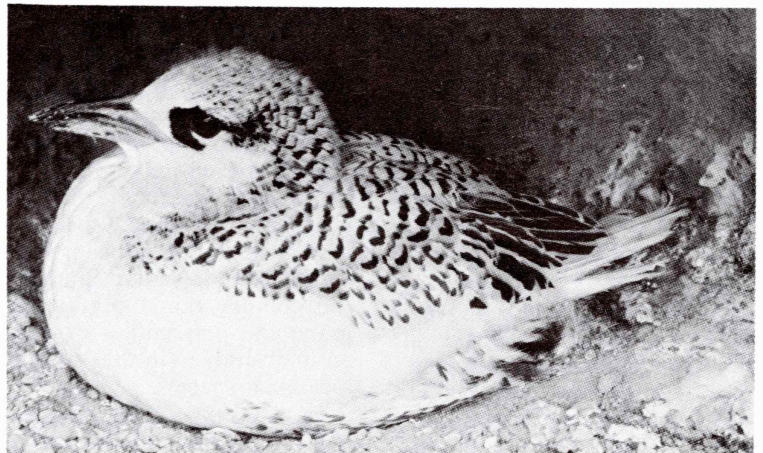
The grey ternlet is one of the most attractive of the small terns on Raoul. It is very delicately built and resembles the white tern, probably the most ethereal of all sea birds.

Redressing the balance

What has been done, then, to redress the balance on Raoul Island? A considerable amount. The Wildlife Service's first practical involvement with the island began with a visit in 1954 which resulted in a recommendation that the goats should be eradicated. Accordingly, the next year a two-man team from the Forest Service destroyed 1422 goats and 45 cats and estimated that about 400 goats still remained.

In 1966-67 an expedition organised by the Ornithological Society of New Zealand visited Raoul Island for 10 weeks and found that in the intervening 11 years the goat population had risen to over 3000. This expedition, too, recommended that the goats and cats should be destroyed.

A further expedition in the winter of 1972 which consisted of eight men representing the Wildlife Service, Forest Service, Department of Lands and Survey, and the Department



[Wildlife Service photo by B. D. Bell]

A juvenile red-tailed tropic bird. Of the two species of tropic bird in the South-west Pacific, only the red-tailed has been reliably recorded in New Zealand waters. It breeds on several islands in the Kermadec group. The plumage of young tropic birds is barred, not white as in the adult, and they lack the latter's long, red central tail feathers.

of Scientific and Industrial Research spent 7 weeks on the island and eradicated 1286 goats and 61 cats. About the same numbers of both were estimated to survive. In 1973 a four-man team from the Wildlife Service and the Forest Service destroyed 627 goats and 15 cats on a 14-week stay on the island.

The most recent campaign was conducted in late 1974, when an eight-man party representing the Wildlife Service, Forest Service, and Department of Lands and Survey spent almost 3 months on Raoul Island and accounted for 712 goats and 33 cats. This party found that plant regeneration, which had been observed previously in 1973, was progressing very satisfactorily; and this is most encouraging, as it suggests that at least some of the rare native plants should recover quickly once the goats have gone. It also found that the cat population was low, and an extended campaign this year could well prove particularly effective in ridding the island of this menace.

Removing goats

Beside the cat menace on Raoul Island is that of the goats. If the native flora and fauna of the island are to survive, and their claim to survival is, after all, the prior one, these aliens must be removed. Removal can be effected in only two ways—live trapping, where applicable, and killing. The former, though more humane, is unfortunately impracticable, as it demands time and manpower which are just not available, as well as raising the additional problem of where to relocate the transferred animals. Killing, though regrettable, is therefore necessary.

Goats are hunted on foot with dogs and rifles (men with experience and skill in shooting are chosen). Cats are trapped and shot and in future will probably be poisoned.

Recently the Wildlife Service has been criticised for its use of dogs on Raoul Island to assist in the cat extermination programme. Much of the criticism has stemmed from an incomplete understanding of the facts; when these have been explained to the obviously sincere people concerned, fears have been allayed. The dogs were used experimentally in the hope that they would prove useful in flushing, tracking, and treeing cats to enable them to be shot cleanly. However, it appears that they were not as effective in this role as was first thought, and their future use is at present being debated.

Wily hunter

The feral cat is a vastly different creature from the non-pedigreed "domestic" so familiar in many homes. The feral animal is a suspicious, wily hunter well adapted to survive by killing and generally incapable of being turned into a hearth-side favourite. It is to be regretted that in some instances an entirely gratuitous assumption was made that an organisation whose primary responsibility is to ensure the welfare of the native fauna of this country would conduct an inhumane persecution of even an undesirable (in that specific location) species.

The Wildlife Service, which boasts its fair share of cat lovers, recognises the urgent need for the removal of goats and cats on Raoul Island (and probably on all off-shore islands where they are present), and considers that their removal must, of necessity, be

brought about by killing both species in the most humane, effective manner possible. As a last consideration, when the goat and the cat have finally gone from Raoul Island — where they had no right to be in the first place—there is no danger of their being inadequately represented elsewhere. **There is a very real danger with the wildlife they have decimated.** All the petrel species which have been reduced on, or have gone from, Raoul fortunately breed on at least a few other islands in the Kermadec group and may well return to Raoul as conditions there improve.

The future of Raoul Island can be said to be reasonably optimistic. Though it will be by no means an easy task, it should be possible to clear the island completely of both goats and cats in the not-too-distant future, which will allow plant regrowth and ease pressure on the sea birds and parakeets. As cat numbers are progressively reduced, a close watch is being kept to see if there is any resulting significant increase in the fairly small rat population at present on Raoul. So far the reduction in the cat population does not appear to be causing any observable increase in rat numbers.

As in many other places, man's interference and indifference on Raoul Island have left their mark on yet another important biological reserve. But the mark, if not entirely erasable, can at least be made less distinct and, given the time and the support of an understanding and sympathetic public, the Wildlife Service and other concerned organisations may still be able to preserve much that is of value on, and much that is unique to, this remarkable island.

Scientific planning of reserves

By C. A. Fleming

THROUGHOUT the world the pressure of expanding human populations, of "development", and of production to satisfy economic and social needs is leading to the exploitation of natural resources and reducing the areas of primitive vegetation and the animals they support. Any scientific approach that will enable conservationists to plan the most efficient preservation may eventually increase the wildlife saved from extinction.

IN New Zealand the forest industry's policies for converting indigenous forest to pine plantations have focused attention on our ignorance of the principles that may determine the future populations of birds and other animals in any biological reserves that may be set aside. Help in understanding comes from unexpected sources.

Island biogeography

During the past decade great advances have been made in the understanding of the processes of colonisation of small islands by birds, of the development of their faunas, and of the limitations that prevent the birdlife on small islands from ever attaining the diversity that pertains on the large mainland areas from which they are derived. Many islands, for instance, volcanoes and coral atolls, owe their land birds to immigration by flight across the sea. Other island faunas result from the isolation of former peninsulas and mountains when sea level rose some 100 to 200 metres as a result of the melting of Ice Age glaciers about 10 000 years ago. Reserves of native forest are "islands" to birds or other animals that rarely cross the

"seas" of pine plantations or farm land surrounding them.

A mathematical approach to the question of island colonisation by R. H. McArthur and E. O. Wilson in the 1960s (hailed as a "scientific revolution") has been followed up in the New Guinea-Solomon Islands region by Professor Jared M. Diamond, of the University of California.

The basic McArthur-Wilson theory is that every island tends to approach a steady-state equilibrium in which the number of colonisations in a given time equals the number of extinctions. Theoretical interpretations have been checked by studies of islands that have lost their fauna by volcanic action (for example, Krakatoa) or by tidal wave. By comparative analyses of the bird faunas recorded on islands of different size and age in the New Guinea-Solomon islands region Professor Diamond has established important principles that are relevant to any plans we may make for the conservation of representative reserves* in

* Professor Diamond and many other Americans use the word "preserves" for what most New Zealanders would call "reserves".

large areas of forest planned for conversion to farm land or imported pine plantations.

1. As might have been expected, **the number of species that can persist indefinitely in equilibrium on an island is related to the area of the island**, and the same generalisation applies to an island-like reserve of native forest surrounded by pasture or by pines.

In a New Zealand context we all know what to expect in an isolated scenic reserve of a few hectares surrounded by farm land.

Apart from the odd visiting tui, morepork, pigeon, or cuckoo, if the reserve is not too far from other forest areas, we can expect the silvereye, fantail, and grey warbler as breeding species. These basic few native species persist in (or readily colonise) the shrubberies of our suburban gardens, the second-growth that comes after fire or other disturbance, or scrub that has established on sand dunes. In such localities they may reach denser populations than in large areas of virgin forest. They seem to be the local equivalent of what Professor Diamond calls "supertramp" species, and it is significant that they have reached the Snares Islands, though only the silvereye has bred there.

2. **The extinction rates on islands are related to area**, so that large islands have lower extinction rates than small islands; that is, the survival prob-

spects for a given species are area dependent.

Living in Auckland in the mid 1930s, I could find pied tit on Motuihe Island, near Nihotipu Dam, and in the Hunua Range, but the population on Motuihe Island, restricted to a small area of forest, has since succumbed.

In 1935 at least one kokako had persisted in a private reserve of about 7 hectares near the Kopuapounamu-Tauranga-kautuku junction (Fairlie's property, East Cape district) since the surrounding land had been cleared of bush soon after the First World War. At first there had been at least four of them (Mrs Fairlie told me), then a single pair for some years up to 1934, and in January 1935 (when I was there) I saw only one bird, singing and feeding in the canopy of bush that had by that date lost its undergrowth through access by cattle, so that the farm chickens scratched in the leaf litter below. A few years later I learned that kokako were no longer present. Similarly this species became extinct in the bush remnants of the Manurewa-Papakura district after persisting until the 1920s, but it remains in the larger forest areas of Hunua Range.

3. The number of species on an island (or forest reserve) will decrease with increasing distance from the mainland (or from other forest areas), other things being equal; that is, if their area and ecology are comparable. Some species have physical or psychological barriers that prevent their crossing any barriers at all of sea or unsuitable habitat. Reserves are usually established to preserve the species already present, so that these factors may

not seem relevant. The final species composition of a reserve fauna, however, may be affected if a species that becomes extinct cannot recolonise the reserve owing to its inability to cross the surrounding barrier.

Though evidence is rather circumstantial, New Zealand ornithologists would predict, I think, which forest birds can recolonise across a barrier of farm land or plantation and which would find such a crossing impossible. Native pigeons and kaka fly long distances in foraging (so it is no surprise that they once colonised Norfolk and Chatham Islands). Wattlebirds, on the other hand, have no record of recolonising isolated bush areas without assistance, so that the Manurewa-Papakura bush areas were not repopulated from the Hunuas once they lost their kokako.

Saddlebacks on the Hen and formerly on Stephen and South Cape Islands may have been on those islands since the last Ice Age, when these islands were linked to the mainland. For such species each extinction is irrevocable unless man steps in.

4. The minimum area of forest necessary to ensure survival differs from species to species. Our instinctive feeling that a large area of forest will contain rare species not present in small reserves has a basis in fact; Professor Diamond concludes that "for most species . . . there is no chance of survival on islands below a certain size".

Diamond found New Hanover Island, one of the Bismark Archipelago islands, which was joined by land-bridge to New Ireland in the

Late Pleistocene, has since lost 22 percent of New Ireland's species, including every endemic Bismark Island species (the ones most in need of protection), so that New Hanover (1200 square kilometres) would be too small to be an effective rain forest faunal preserve.

We do not know the minimum areas for perpetuation of each New Zealand forest species. I think one could guess that white-eyes need less than bellbirds, which need less than yellowheads, which need less than kokako, which (perhaps) need less than the high-flying kaka, which forages over a wide area of forest seeking seasonal foods. Certainly our empirical experience strongly suggests that some species will recolonise isolated areas from a distance (for example, kaka visit Poor Knights and Fanal Islands, but these islands, I think, do not (or cannot?) maintain them permanently), whereas some other species have never recolonised a bush patch (or island) across a barrier of open country or sea.

Much research will be required before we can be confident of the minimum area requirements for the survival of New Zealand forest birds. In the meantime some idea of such areas can be obtained by empirical surveys of the size of areas where a species has persisted in relation to the areas where it is absent. Thus kaka apparently live permanently on Mayor Island, Kapiti, Hen, Little Barrier, Big South Cape, and Codfish Islands, but not on Red Mercury, Poor Knights, Fanal, Stephens, Stage, or Kaimohu Island even if they visit there occasionally. For this species, therefore, an area at least as large as Hen

Island (c. 476 hectares) seems the minimum for permanent occupation, but the minimum area for species of poor dispersal ability may be very different.

"Incidence function"

Professor Diamond has described a method of estimating the survival prospects of a species by determining its "incidence function", which shows the probability whether a given species may occur and persist on an island of a particular size, but this seems to have limited application in the New Zealand scene.

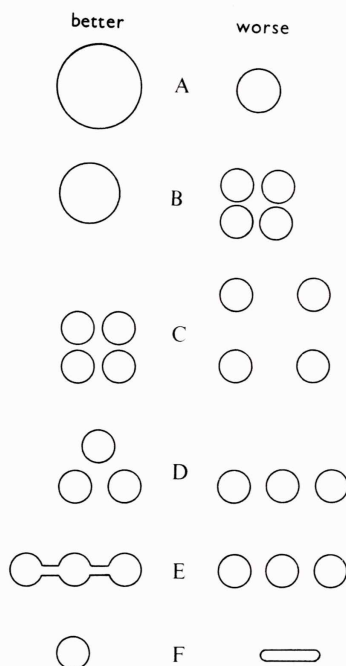
The recent introduction by the Wildlife Service of saddlebacks to additional islands of suitable ecology in the Hauraki Gulf and off Stewart Island, and of robins to islands in the Marlborough Sounds, is an experimental approach to the problem of defining their minimum areas for perpetuation, but the results may not be known for some years, when the introduced species will have experienced the full range of vicissitudes to which such isolated populations are liable. We must be prepared for the possibility that some or other islands otherwise apparently suitable are below the minimum size for permanent survival of these species.

At the end of the Pleistocene, when water locked up in ice melted and raised sea level by 100 to 200 metres, parts of the land were isolated to form islands. Some of these land-bridge islands were "super-saturated", supporting a rich continental fauna with more species than the appropriate equilibrium number for their areas. During the last 10 000 years the smaller "land-bridge islands" have lost their initial

excess of bird species, but larger islands of several hundred to several thousand square kilometres still have an excess. The time taken for an island to lose the excess of species ("relaxation time" in Diamond's terminology) increases with increasing land area. Thus we have a further principle:

5. When a forest reserve is established and the surrounding habitat destroyed, **it will at first contain more species than can persist there at equilibrium.** The larger the reserve the slower is the loss of species and the higher the equilibrium number. "A small preserve not only will eventually contain few species, but also will initially lose species at a high rate."

This principle must have applied to many relict bush areas



Principles for the design of faunal preserves are portrayed in these five comparisons. The better designs would lead to the survival of more species than would the alternatives shown on the right.

during the pioneer period of forest clearance like Fairlie's bush patch mentioned above. At first such areas are thronged by abundant individuals of all normal forest species, but gradually one species after another disappears until the standard quota is left—perhaps bellbird, tui, creeper, fantail, tit, warbler, silvereye, morepork, pigeon and cuckoos. But in New Zealand this process is complicated by the effects of country-wide ecological changes such as the introduction of predators during the same pioneer period.

Design principles for natural reserves

From the conclusions drawn from background studies of island avifaunas Professor Diamond lists a set of design principles illustrated by a diagram (reproduced at left), to minimise extinction rates in any reserves set up:

A. A large reserve is better than a small reserve, because it can hold more species at equilibrium and will have lower extinction rates.

B. A reserve in uniform habitat should generally be divided into as few disjunct areas as possible. (In tropical forests a highway is a dispersal barrier that reduces the effective area.)

C. If a reserve of homogeneous habitat has to be divided, the parts should be as close as possible.

D. Disjunct reserves should be clumped and not arranged linearly, as this reduces interchange between their populations and any local extinctions may be permanent.

E. Connecting disjunct reserves by strips of protected

habitat will "improve their conservation function", by permitting interchange of populations with restricted habitat preferences.

F. A reserve should be as nearly circular as possible to minimise dispersal distances within it.

The lessons for New Zealand are clear. To preserve as many bush bird species as possible when an area of bush is condemned to be converted, one large reserve is better than a dozen small ones of the same aggregate area, especially if the latter are scattered and widely separated by grassland or plantations. Reserves distributed at intervals along a highway or valley will be better if they can remain linked by bushed gullies, cliffs, or roadside strips, but such narrow strips by themselves are less effective as reserves than the same area of bush in a nearly circular area.

Diamond concludes that if 10 percent of a habitat is saved as a faunal reserve, only about half the species of the original

expanse of habitat will remain when the reserve reaches equilibrium. This is a poor lookout for the New Zealand forest fauna when we realise it does not make any allowance for the adverse ecological changes due to introduced predators and competitors.

So far, it seems, a lower proportion has been lost from New Zealand forests. According to foresters, about 66 percent of the land area of New Zealand was forested when European settlement began and some 22 percent remained in 1955, but the cleared area included a high proportion of the lowlands and the surviving area was dominated by steep lands.

About 30 bird species were once recorded from the forests of the North Island and about the same number (though not the same species) from South Island forests, but even in the early days of settlement some of them had already become extremely localised (for example, kakapo, bushwren, laughing owl, and little grey kiwi in the North Island). Af-

ter 135 years 11 species have become extinct (or virtually so) in North Island forests and about 9 in South Island forests (that is, about 33 percent). Many individual bush areas have lost more "than this; for instance, the Northland and Tararua Range forests have lost almost 50 percent of their original faunas. Perhaps the number of bird species in our mainland forest remnants have not yet "relaxed" to new equilibrium values, so that more species will disappear before equilibrium is reached.

One thing is certain, with the economic pressures now operating to convert native forest to *Pinus radiata* plantations, every effort must be made to ensure that the establishment of forest reservations is planned with full knowledge of the principles established by research such as is reviewed here. Otherwise we will be left with token reservations perhaps serving a scenic function, but inadequate to conserve anything but the commonest bird species, and we will lose the endemic families and genera that really distinguish the New Zealand avifauna from those of other lands.

Annual meeting in June at Wellington

NOTICE is hereby given that the annual general meeting of the Society will be held in Wool House, Featherston Street, Wellington, on Saturday, 21 June 1975, at 9.15 a.m.

Agenda

1. Apologies.
2. Minutes.
3. Business arising from the minutes.
4. Obituary.
5. Annual report and statement of accounts.
6. Appointment of auditors.
7. Thanks.
8. General business.

Note: The annual report and statement of accounts is enclosed as a supplement to this issue.

Council meeting

After the annual meeting the Council meeting will begin at 2 p.m.

Sanderson Memorial Lecture

The Sanderson Memorial Lecture will be given at the same venue, starting at 8 p.m. It will be delivered by Mr I. L. Baumgart, Commissioner for the Environment.

This lecture is open to the public; so please bring your friends.

References

The papers by J. M. Diamond on which this article is based are in the *Proceedings of the National Academy of Sciences, U.S.A.*, vol. 69, p. 3199, 1972 (in which he deals with relaxation times), in *Science*, vol. 179, p. 759, 1973 (distributional ecology of New Guinea birds), and vol. 184, p. 803, 1974 ("supertramp" concept), in *Biological Conservation*, due for publication in 1975 ("Lessons of modern biogeographic studies for the design of natural preserves"), and in the *Proceedings of the 16th International Ornithological Congress*, in press ("Relaxation and differential extinction on land-bridge islands; applications to natural preserves"). (I am grateful to Professor Diamond for copies of the last two papers.)

News and views from headquarters

Searle lecture tour

SINCE the Forestry Development Conference, which occupied much time of Executive members, there has been the Graham Searle lecture tour on the beech forests issue, which, from the Society's point of view, was most successful. This allowed Mr Searle to give the public the facts, ask questions, and supplement the material written in his book, "Rush to Destruction", which it is hoped has been widely read. Critics say the book is well written, factual, and fully researched.

Financial appeal

For the first time the Society has launched a financial appeal to the business community throughout New Zealand. We realise that the economic climate is not right for this, but it was felt that there is a special case in the endeavour to **Keep New Zealand Beautiful**.

Rising costs in every field of the Society's work have meant that more finance is needed for the pursuit of the many issues in which the organisation is involved.

Displays

Arrangements have been made with U.E.B. Industries Ltd. on a part sponsorship basis to provide cardboard portable display stands which will fold up to go in the boot of a car. Branches can make good use of these at their meetings, at shows and exhibitions, and in the major stores, where they could be used to recruit members by

the placing of enrolment forms with the display to allow the public to help themselves. The addition of some native plants with name cards would be worth while.

Car stickers

Society car stickers have been most popular (price 15 cents each). The run on them since Christmas has completely exhausted supplies. Arrangements have been made for the manufacture of a new batch and this should be to hand shortly.

Conservation Week

This year's campaign begins on 2 August, and already branches are making plans to take part.

World Scouting Conservation Badge: New Zealand Scouting opened the way for a massive participation in Conservation Week 1975 when it introduced the World Conservation Badge, sponsored by World Wildlife Fund and World Scouting, at the National Scout Jamboree at Tokoroa from 1 to 8 January. The badge was explained in a special conservation display which also featured the introduction of the Panda emblem of the WWF and the opportunity for membership of the Wildlife Youth Service in New Zealand.

From all over New Zealand 3000 scouts accepted the challenge to earn this badge in time to become project activity leaders for Conservation Week. These scouts will be available to assist district organisers this year, and branches are recom-

mended to make early contact with local Scouting and enrol these leaders for activity groups.

Mr Nelson

Mr R. C. Nelson, past president, suffered an illness recently which necessitated two operations.

Happily he has made a remarkable recovery and continues to help the Society in many ways from his home at 15 Aurora Street, Petone. Mr Nelson was most appreciative of the many messages of good will he received during his spell in hospital.

Anti-litter

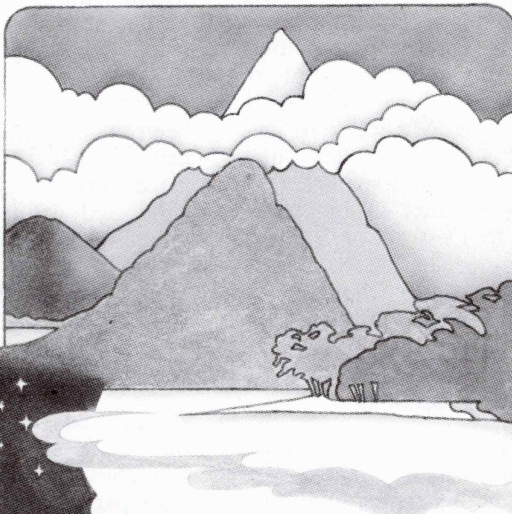
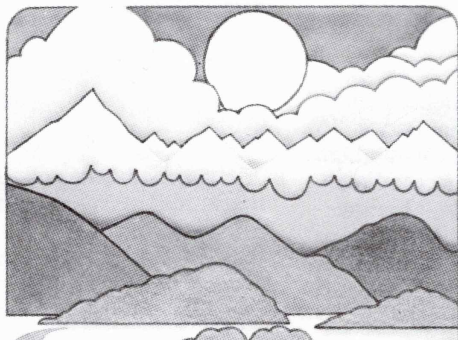
The Society is most concerned at the continued litter problem throughout the country. This is costing many hundreds of thousands of dollars, and the President made a press statement just before Christmas, calling on the public to place their litter in the litter bins provided over the holiday period. He stated that it seemed New Zealanders would never learn, and it appeared that the only way to control the problem effectively was to institute fines, as had been done in Singapore, Hong Kong, and various other countries.

A revision of the Anti-Litter Act is essential if any real improvement of the situation is to be made.

Conservation Coin Collection

The president of the World Wildlife Fund, Prince Bern-

This land is not just beautiful it's good medicine!



TE ANAU

Te Anau is the gateway to 3,000,000 acres of Fiordland National Park. Sanctuary for all bird life, it was here that the supposed extinct notornis was found. Steeped in Maori history and legend the area is magnificent with mountains, untouched bush, waterfalls, underground rivers, and glow-worm caves.

LAKE MANAPOURI

This lake is the most beautiful in New Zealand. It is studded with some 30 small islands which are covered with native forest.

The West Arm of Lake Manapouri is reached by luxury tourist cruiser. After arrival at West Arm, site of New Zealand's largest hydro-electric station, passengers are taken by coach down to the powerhouse, 700ft. below ground level. The coaches travel across the Wilmot Pass showing you some of the most beautiful and picturesque scenery in the world.



MILFORD SOUND

Milford Sound is breathtaking. Rudyard Kipling described it as 'the eighth wonder of the world'. This great sea-canyon is ten miles long and flanked by mountains rising up to 6,000ft. Carved by glacier action, the Sound is 430 fathoms at its deepest point, and averages 250 fathoms. Monarch of Milford is Mitre Peak, a 5,560ft. pinnacle of rock. A launch trip on the Sound is essential to appreciate the beauty.

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hard, Prince of the Netherlands, says:

"It is most gratifying to me that 24 sovereign states have agreed to join in the Conservation Coin Collection, which is being sponsored by the World Wildlife Fund (WWF) and the International Union for Conservation of Nature and Natural Resources (IUCN). Their unprecedented decision to participate in the collection amply demonstrates that our efforts in the past 12 years—during which time we have undertaken more than a thousand conservation projects in 84 countries—is recognised and appreciated. This collection will ensure that such valuable work can continue.

"Conservation of our wildlife heritage and our natural environment is not only our moral duty to the generations that follow us, but also necessary for the very survival of our planet.

"I heartily commend the Conservation Coin Collection to you, and I thank you in anticipation of your contribution to protect our natural environment."

Any member interested could write for further information to:

Conservation Coin Collection,
Spink and Son Ltd.,
5, 6, and 7 King Street,
St James's, London,
S.W.1

Part-year subscriptions

From time to time the question arises as to whether there should be a proportionate reduction in subscriptions for persons joining during the financial year.

With the introduction of annual accounts it was decided

that a full year's subscription would be charged, except for persons joining during July and August, who would be given the 2 months free of charge, the subscription paid carrying them through to 31 August of the following year. However, the full year's issues of "Forest and Bird" will be supplied to persons joining during the year.

Enrol a friend

Over 350 new members joined the Society during the January-March quarter, though there was no special recruiting promotion.

Members should try to enrol at least one friend or relative during the next quarter in an effort to reach a membership of 20 000.

New members are most important in two ways. They can bring new ideas and enthusiasm, and they help the finances of the Society. A larger membership would obviously have more influence in pressing vital issues.

The larger headquarters premises and new accounting system can cope with this increase without any appreciable additional costs.

Libraries subscribe

Over the years copies of "Forest and Bird" have been provided free to libraries and similar institutions.

Because of the substantial increase in the cost of production over the past 18 months or so, it was decided to ask libraries if they would pay a subscription of \$2.50 a year, and the response has been most heartening. Some of the smaller libraries do not have sufficient funds to pay a subscription and they will continue to get copies free.

Do you care?

There are many environmental matters which require urgent attention throughout the country, but all too often a few hard-worked branch members are left to undertake the investigations, write reports, and call meetings when a few additional helpers could considerably lighten their burden.

In this Come Alive year we appeal to all members to consider how they can help their branch become more effective.

There are also field days, for which apparently there are far too few people prepared to accept leadership. The main requirement is to be a good organiser, because experts can be called in from outside to deal with specific subjects. A greater involvement of young people, especially at college-training college-university level is important. And it is often advisable to run separate field trips for different age groups rather than to try to involve young people with those much older.

Houhora oyster farming

The Society was asked to comment on the environmental impact report regarding oyster farming in the Houhora Harbour.

The Society did this in the belief that the public is being forced precipitately into accepting a report with which they disagree, especially as there are areas of significant ornithological interest on or near the harbour.

Parks conference

The important South Pacific National Parks and Reserves Conference was held in Parliament Buildings in February and was an unqualified suc-

cess, some 65 delegates from South Pacific countries and the Australian states taking part.

Delegates inspected the Urewera and Tongariro National Parks on a study tour from Auckland to Wellington before the conference proper began and saw the potential of the areas, which impressed on them the need for setting aside suitable areas for similar projects in their own countries while such land is still available.

Mr Frank Nicholls (deputy director-general) and Dr Ray Dasmann (senior ecologist) of

IUCN took part in the conference and arranged a special meeting of New Zealand members.

During the conference, at which the President, Mr John Jerram, and Mr Arthur Reeve represented the Society, members of the Executive were invited to several social functions, and had the opportunity of meeting delegates. Mr Reeve, who has had wide experience in international conferences, was on the organising committee and later served as chief liaison officer during the conference.

Another summer camp in Nelson

NELSON BRANCH has offered to run another annual camp, and this will be held in the Rotoiti Lodge, Lake Rotoiti, Nelson Lakes National Park, from Monday 5 January to Monday 12 January 1976.

Members interested should write now to the secretary, Mr J. K. Martin, 21 Stafford Avenue, Nelson, for further information. Please enclose a stamped addressed envelope.

Intending participants from the North Island need to book their cars on the Picton ferry as early as possible.

Appeal to build bird-watching lodge at Miranda

A STEERING committee set up by Auckland members of the Ornithological Society has launched the Inaugural Appeal of the Miranda Naturalists' Trust to build a lodge at Miranda to enable bird-watchers to observe the bird-life in the Firth of Thames.

The firth's fame as a haunt of shore birds extends far beyond New Zealand. More than 100 species of birds have been recorded along the shores, and this total does not include birds in the mixed subtropical rain forest on the adjacent hills, which is still the home of the kaka, kokako, bellbird, and tomtit. For discerning ornithologists both from other parts of New Zealand and from overseas a visit to Miranda is therefore imperative.

Because industrial development is threatening the sea approaches to the firth and the

coast north of Miranda, many naturalists have thought that an observatory should be set up at Miranda to maintain and amplify the study of birds in the firth. One advantage of such a lodge would be to make it possible to stay and work through more than one tide and perhaps reach the less accessible areas (for example, Waitakaruru and Piako), which tend to be neglected.

Mr Alan Lane, who farms the land on the north side of the Miranda Creek, is willing to incorporate in new farm buildings on the side of the disused limeworks a lodge which will overlook the estuary.

Bird lovers wishing to contribute to the appeal are asked to send their donations to Mr Russell Thomas, 25 Ravenwood Drive, Forest Hill, Auckland 10.

"An Album of New Zealand Birds"

Have you purchased your copy of the jubilee publication — "An Album of New Zealand Birds"?

Get copies for your friends. Price: \$4.50, posted.

This beautiful album is a revision of two earlier books issued by the Society and reproduces the fine water colours painted by the late Miss Lily Daff for the original works.

Copies are available from:

The Secretary,
Royal Forest and Bird
Protection Society of New
Zealand (Inc.),
P.O. Box 631,
Wellington.

What and how much do deer eat in N.Z. forests?

THOUGH there may be wider recognition today of the deer menace in New Zealand, there is little appreciation of the enormous quantities of native vegetation that deer consume. In this article N. C. Lambrechtsen, a member of the Society's Executive, shows how these quantities can be calculated from estimated population totals and discusses the species of plants which are suffering most.

IN a newspaper article in the *Evening Post* of 14 October 1974 the President, Mr J. V. Jerram, quoted figures on deer and what they eat in New Zealand. He gave an average consumption rate of $3\frac{3}{4}$ lb (1.7 kg) of dry food a day, which could amount to 15 lb (6.8 kg) of herbage a day. To produce a trophy head an animal has to be at least 7 years old; therefore, for one trophy head 38 325 lb (17 400 kg) of foliage has to be taken from forests and mountain slopes. Add to this the herbage needed by the mother which gave birth to the animal, and multiply this total by the number of deer in the forests and one gets a frightening figure of the herbage removed.

Preferred plants

Deer are introduced grazing animals just like sheep or cattle. On deer farms they may be fed on lucerne, cereals, or just pasture. They convert this food into low cholesterol meat, which is obviously better for people who have to watch their diet. The flavour of the meat is sought after in Western Europe, especially Germany. In our indigenous forests deer eat a large range of plants, depending on what is available in the particular forest type they occupy.

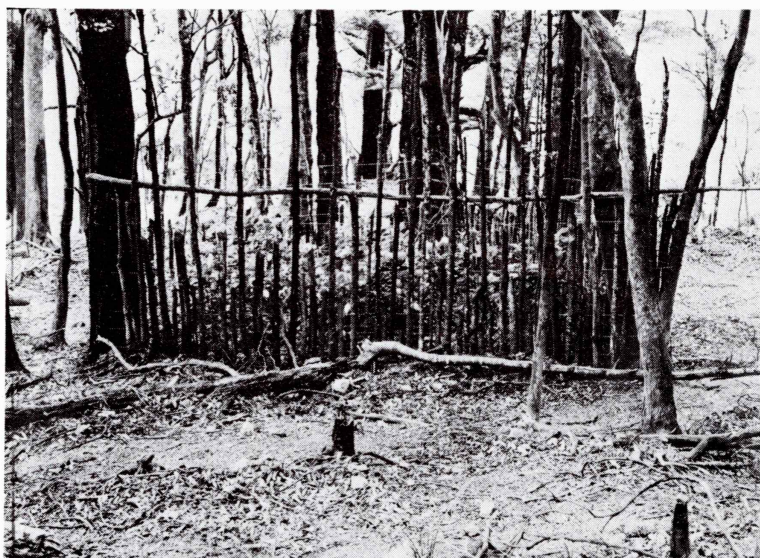
In forests with a large num-

ber of palatable species, such as the kamahi-broadleaf or kamahi-*Quintinia*-miro forests of the west coast of the South Island, Dr J. Wardle, of the Forest and Range Experiment Station, Rangiora, has shown that deer eat the following in order of preference:

- Hen and chickens fern
- Prickly shield fern
- Fuchsia
- Prince of Wales feathers
- Broadleaf
- Lacebark
- Wineberry

- Miro
- Southern mountain senecio
- Creeping tree fern
- Whiteywood
- Pate or seven-finger
- Five-finger (four species)
- Putaputaweta
- Kamahi
- Many *Coprosma* species

More species are mentioned by Dr Wardle, but this list should suffice to show that many native plants could die out if a deer population maintained itself in an area for a long time. He points out that only a few species can provide 50 percent of the diet of the deer. In the West Coast areas he has studied the number of species was seven or eight; seven species of *Coprosma* (out of a list of 22) provided 30 percent of the total fodder.



[Forest Service photo]

This striking contrast illustrates how badly deer and other noxious animals damage native forests. Inside the protected plot plants on the forest floor are regenerating satisfactorily; outside the plot the floor has been devastated.

Dr Wardle also found that the forest communities on the West Coast most susceptible to browsing by deer were seral associations and kamahi-*Quintinia-miro*, a lowland kamahi association. The vulnerability of seral associations both in North Island and South Island forests has been stressed before by several scientists—J. T. Holloway, P. C. Logan, P. J. McKelvey, and R. I. Kean.

The adjective seral is derived from sere, which means "a unit succession comprising the development of a revegetation type from denudation to stabilisation of a habitat". Seral associations occur in gullies, terraces, slips, and other places which have been bare in the recent past. The concentration of deer and opossums on such areas may mean that they will never be covered by a stabilising vegetation. The weakening or removal of the palatable pioneering species may allow the slips and gullies to remain unstable in perpetuity and thus supply shingle to streams which eventually reach rich farm lands or dense settlements.

The deer and opossums have a preference for the most fragile plant communities, which should remain intact at all costs if the lowlands are not to be inundated with flood waters and shingle. The introduced grazing animals should also be kept out of the less fragile forest communities, but it appears that the seral communities should be the first priority for animal elimination.

Quantities eaten

Generally the ratio of 5 deer is equal to 8 sheep is accepted, based on deer farming experiments at Lincoln College under

the direction of Professor I. E. Coop. He states that the annual dry matter intake of one 120 lb (54 kg) ewe is 1310 lb (59 kg). One deer would thus eat $8/5 \times 1310 = 2096$ lb (952 kg) of dry matter a year, which could represent up to 10 000 lb (4750 kg) of green matter a year. Mr Jerram's 7-year-old trophy head could therefore represent a consumption of up to 70 000 lb (33 250 kg) of foliage and not just over half that figure.

Deer in forests eat less than deer on deer farms and their growth rates would be 20 to 30 percent lower. Nevertheless, the annual herbage consumption is large, especially when it is multiplied by the number of deer in the forests.

How large is this number? Mr J. T. Holloway in his Sanderson Memorial address for 1973 estimated that up to 150 000 deer are shot annually. Using Scottish data of 180 000 deer, which yield 30 000 carcasses each year, we may arrive at a New Zealand deer population of 900 000. Mr A. N. Perham's estimate in 1922 was 300 000, so that deer numbers may have trebled in just over 50 years. Their annual herbage consumption runs to the staggering figure of 855 million kg or 855 000 tonnes of dry matter. These figures do not include what the opossum population eats every year, but I have no doubt that it would amount to many millions of kilograms also.

Since 1892 scientists and informed laymen have been saying that "these priceless forests of ours are in imminent danger of being transformed into debris-fields and waste ground, and the water which they controlled can become the master, pouring down the naked slopes

after each rain storm and bearing with it heavy loads of stone, gravel, and clay to bury the fertile arable lands below and occasion floods in the rivers. Is the protection of deer and the like to be permitted to lead to such disaster?" (L. Cockayne, *N.Z. Forest Service Bulletin*, vol. 4, Part 2, page 11, 1928).

Dr Cockayne's question is even more urgent now as the deterioration of our forests continues unabated.

No wild cats now on Cuvier Island

IN reviewing events of the last 19 years in the August 1974 issue of "Forest and Bird", Mr R. C. Nelson stated: "Goats, for instance, have been removed from the Three Kings and Cuvier, but Cuvier, which has tuatara, bush, and sea birds, including many petrels, still has introduced wild cats."

However, the Wildlife Service of the Department of Internal Affairs, has written to advise that cats have been eliminated from Cuvier, the last being destroyed in 1970.

This project can be regarded as one of the most successful achievements in the field of practical wildlife conservation. Since the removal of goats and cats, Cuvier's indigenous flora and fauna have shown a remarkable recovery, and the North Island saddleback, which disappeared from the island soon after the arrival of cats late last century, has been re-established. The saddleback is one of the most plentiful and conspicuous birds present.

Beech forest lectures draw many keen audiences

ILLUSTRATED lectures given on behalf of the Society by the noted British conservationist Mr Graham Searle, author of the book "Rush to Destruction", which deals with the South Island proposed beech forest utilisation scheme, proved a great success. Mr Searle generously gave 13 lectures in 16 days, plus one in Nelson the day before he boarded the plane to return to London, where he had an important assignment on 10 April.

Mr Searle's book was launched by A. H. and A. W. Reed at a special function at Wellington on 12 March, and the following evening he gave his first lecture in the Concert Chamber of the Wellington Town Hall, which, in spite of a wet night, was almost full.

He then flew to Invercargill, where he spoke to a packed audience before rush-

ing to Dunedin the following day. There he gave two well-attended lectures before moving on to Christchurch on 18 March, where almost 700 people crowded into the Limes Lecture Hall of the Christchurch Town Hall.

West Coasters' disquiet

The next lecture was in Greymouth the following night, at which the new West Coast Branch had an attendance of almost 200 — one of the best-attended meetings on the Coast for some years. From the comments of the man-in-the-street and from the questions asked it seems that West Coasters do not want a major industry such as a pulp mill, and in fact are not happy generally with the beech forest scheme.

Several speakers said that they did not want the quality of life or the natural beauty of the West Coast disturbed by major industries, but they would willingly accept small localised industries such as particle-board factories and specialised furniture production, which would use a fairly low volume of timber and provide a continuing employment in the future.

Mr Searle had large attendances at Palmerston North, New Plymouth, Auckland, Hamilton, Wanganui, Napier, and finally at Nelson, where he received a particularly warm welcome.

He has asked that his personal thanks be conveyed to all who assisted him in so many ways during his hurried tour. He appreciated the hospitality and many kindnesses shown to him, and especially



[Burke Harper photo

An impressive display which a Wellington bookselling firm arranged in its window to promote the Graham Searle book "Rush to Destruction".

he thanks the Society for making the lecture tour possible. He hoped that his efforts, and those of the Society, to preserve the beech forests will bear some fruit.

The Society owes a debt of gratitude to Mr Searle for helping to **Keep New Zealand Beautiful**, and for doing such a fine research job culminating

in the publication of his book, a factual and fully researched document which could prove invaluable in further study of this controversial issue. As he says: "I am a Pom, and I am not telling New Zealanders what to do. I have tried to give them the facts as I see them, and I leave it to them to make up their minds what they want.

But when they do, I would ask all to write either to their Member of Parliament or the Minister of Forests and to make their views known before the election later this year."

Mr Searle is emphatic that nowhere near enough research has been done into the effect of removing the indigenous forest from much of the higher country in the project area, where serious erosion could well occur and do irreparable damage.

New branches formed on the West Coast and in Far North

A WARM welcome goes to the new West Coast and Far North Branches, which have been established since Christmas. Full coverage of the country has now been achieved, though another branch based at Whangarei would be preferred.

The West Coast Branch was formed at a special meeting in Greymouth, which was addressed by the national treasurer, Mr Norman Dalmer. The

chairman is Mr Jack Richards, J.P., M.B.E., former Mayor of Hokitika, and the secretary is Mr Jim Percival, director of parks and reserves, Hokitika.

Efforts to form a Far North Branch have been going on for some time and were brought to fruition at a special meeting arranged by the President, Mr John Jerram, who was on holiday in the area. Mr Terry Crouch was appointed chairman and Mr Ted Biggs secretary.

Friends of Bushy Park rally to help property

AT the suggestion of the Waikato Branch and a number of members in other parts of New Zealand it was decided to set up a Friends of Bushy Park Guild to permit members particularly interested in this fine property the opportunity to contribute to its maintenance and support and gradually to make improvements. Such a scheme will also provide a pool of labour with particular skills so that working parties can be called on once or twice a year to tackle specific tasks.

Interested members are therefore invited to join the Friends of Bushy Park Guild at an annual subscription of \$2 a year.

Friends of Bushy Park receive an attractive certificate.

Already a good number of members have joined the guild, and some have donated curtains and other furnishings to improve the homestead.

If you are interested, write to head office for an application form or to the guild secretary, Mrs Margaret Harold, P.O. Box 947, Wanganui.

Corrected figures for West Coast beech forest areas

FIGURES quoted in an article on pages 11 and 12 of the February issue about a visit to the West Coast beech forests are

not correct, according to information supplied by the Forest Service.

The amended figures are:

● Beech management	100 000 acres
● Planting with supplementary hardwood species in beech area	150 000 acres
● Podocarp-hardwood forest for indigenous management	90 000 acres
● Conversion to exotics, including 30 000 acres of existing exotic forest, scrub, and open land	240 000 acres
The total production area is	580 000 acres

The Service says that the area to be managed as indigenous forest would be 340 000 acres, and the area converted to exotics 211 000 acres, comprising 128 000 acres of beech and 83 000 acres of podocarp-hardwood forest.

Training of juniors is an important branch activity

OVER the years the Society has been fortunate in having many enthusiastic young members who take part in field days and other activities throughout the country.

The Society would like to do far more nationally for these members, but does not have the resources. Apart from supplying project material and posters to schools and answering letters requesting information, head office can do little else.

However, it is at branch level that the opportunities arise, and the chairman of the membership committee, Lt.-Col. F. A. Bishop, last year circulated a questionnaire to branches on the Society's Junior Nature Training Scheme. He had only a few replies, but it was encouraging to learn that a few branches take the training of juniors most seriously and go to much trouble in the execution of their plans.

Suggestions

For the benefit of branches and all interested Lt.-Col. Bishop passes on the following suggestions for assisting young members:

1. Co-opt a member to your committee who will be responsible for all training matters. (This would be a good "Come Alive" job for a retired school teacher.)
2. Use that member to find others who would give time to training young people or to arranging young people's programmes. Be careful in your selection of leaders. Train them and watch them; some enthusiasts can be very boring.
3. One branch ran a seminar to train primary school teachers in nature matters; that is one way of getting to the hub of the problem.
4. Another branch has a community involvement programme that is based on a school, a historical society, and the Society.
5. Some branches set aside special expeditions for juniors and for family groups in their field trip programmes.
6. Share the load. The same leader does not have to take out juniors each time. The juniors might welcome a new face.
7. **Plan** your junior programme. Tailor it to the resources and time available. One or two excellent trips may whet the appetite for more.
8. Use plenty of training aids, but make sure that you don't rely on the movie or slide projector all the time. Remember the Junior Nature Training Scheme is another training aid. Use all the senses of sight, hearing, taste, touch, and smell.
9. Make the youngsters **participate, by doing, walking, drawing, and discussing.**
10. Use the numbers game. Don't be discouraged if there are only six or seven young people interested. That is an ideal group. There might be a future branch chairman among them.
11. Have adequate preparation. The more you prepare, the **deeper** the instruction is imprinted into the memory.

Activities

Here are some snippets from replies, which might assist in planning junior activities:

1. A school holiday one-day excursion.
2. A school holiday seminar in a museum and outdoors on bird identification.
3. Sunday afternoon meetings in winter.
4. A special junior weekend training camp.
5. Plant collection, shell collection, and keeping a nature notebook competition.
6. Lectures at schools with films and slides.
7. School classes' visits to reserves with Forest and Bird guides.
8. Combined trips with tramp-ing clubs.
9. Photo, slide, and print competitions, or a painting competition.
10. Building display models.
11. Growing plants for displays.
12. Planting programmes by school pupils.

There are many other ideas which could be used with advantage.

If any members feel they can help branches with junior training, they should contact their local secretary.

New telephone number for head office

HEAD office's telephone number is to change after the 1975 telephone directory has been issued.

The new number will be: 728-154.

BOOKS

"Birds in New Zealand":

C. J. R. Robertson (Ed.)

THIS is a collection of the following eight essays by well-known New Zealand ornithologists, both professional and amateur:

"Bird Habitats In New Zealand"—I. A. E. Atkinson.

"Birds of Forest and Mountain"—R. B. Sibson.

"Birds and Man"—P. C. Bull.

"Waterfowl and Upland Gamebirds"—T. A. Caithness.

"The Wading Birds"—H. R. McKenzie.

"Birds of Ocean and Shore"—F. C. Kinsky and C. J. R. Robertson.

"Extinct Birds"—D. G. Medway.

"Rare Birds and Conservation"—Sir Robert Falla.

As a fitting introduction to this subject the first chapter discusses all types of habitat, and the general scene is described with particular reference to the effects of the colonisation by European man. In "Birds of Forest and Mountain", the author describes habitats and the birds found in them and takes the "inquisitive naturalist" on a journey through New Zealand from north to south with entertaining asides and useful suggestions on how and where to see the most species.

"Birds and Man" paints the picture of the "two avifaunas"—the native species, confined for the most part to the mountains and the remnants of forest, and the introduced birds, brought here

with many different aims in mind and now providing many problems and some few benefits.

"Waterfowl and Upland Gamebirds" and also "Wading Birds" are each adequately described, discussed, and listed with admirable directions on where they are to be seen. Unfortunately, this last service is not extended in the chapter on "Birds of Ocean and Shore". There are few visiting naturalists who do not have penguins and albatrosses near the top of their lists of birds to be seen.

The chapter "Extinct Birds" might have conveyed a livelier picture of the past with a description of the ancient landscape, entirely devoid of mammals, but with moas, eagles larger than the golden eagle, and other birds. Instead we have the only description of the moas as "an endemic order which consisted of seven genera containing 25 species (depending on the system of classification adopted)."

"Rare Birds and Conservation" surveys the status of some individual species, discusses reasons for their decline, and notes the efforts being taken to preserve them. New threats to wildlife, such as the technical efficiency in the dispersal of pesticides, are noted as problems calling for much more research. The safeguarding of habitat, which generally has been so drastically modified in the last 100 years, is clear-

ly defined as the major factor in the preservation of rare birds. Readers who continue to follow the fortunes of the black robin, kakapo, and black stilt may not echo the author's expression that the prospect for our rare birds calls for concern rather than despair. However, concern is more fruitful than despair.

These eight separate contributions have resulted in some overlapping and repetition; for example, the kea's reputation as an attacker of sheep is discussed on pages 44-45 and again on pages 55-56. This repetition might have been avoided with more stringent editing, but I do not find it a fault, and it demonstrates that one really cannot put knowledge into compartments. The book is well illustrated with good photographs throughout the text—60 in black and white and 8 in colour—but the reproduction of the coloured photographs is only fair. The southern race of the royal albatross is called southern albatross in the caption to an excellent photograph of this bird contributed by the editor. There is an unfortunate incorrect naming of one of the authors on the front flap of the jacket.

The touring bird-watcher who takes up this book on arriving in New Zealand will have secured a simple, brief, but comprehensive introduction to the whole spectrum of bird life here. As such it is a valuable addition to our bird literature and I suggest that a great many New Zealanders should overlook that it is addressed to tourists and accept it as the "background reading" to their appreciation of our birdlife.—*B.A.E.*

A. H. and A. W. Reed Ltd.
\$2.95.

"Under the Mountain":

Kleeman and Dodd

EGMONT National Park's flora and fauna are the subject of this impressive book, described on its jacket as a "Pictorial essay on a unique mountain and its life community". This is surely a recommendation to all of us who know and love the forests and birds of our national parks, but the book itself will result in disappointment to most people.

There are many fine photo-

graphs, but out-of-register colour printing and distortion of colour values have to be accepted throughout. I have paid special attention to the birds. What are described as reef herons are actually black-headed herons (*Ardea melanocephala*) of southern Africa, and the cuckoo chick is not our longtailed cuckoo as stated, but a European cuckoo in the nest of a reed warbler. These species are

not in New Zealand, and after the jacket flap states that "it is in this reserve that Bill Kleeman has recorded these 240 full colour photographs", it is very unfortunate that these photographs and captions should have been included.

The concept of a photographic essay on a national park is to be commended, but it is most disappointing that the publisher of "Under the Mountain" has not remained true to the subject and has not produced the quality printing expected in a publication of this nature.—*B.A.E.*

Lucas-Altman Ltd. \$9.95.

Wellington members take on hard planting job

MORE than 360 trees and shrubs have been planted by Wellington Branch members during the last 2 years in the grounds of the new Bowen Hospital at Crofton Downs, Wellington.

Establishing trees and shrubs there is hard, because the site is exposed to southerly winds and frosts in winter and hot, drying north-westerlies in summer.

Of the 200 plants put out in 1973 about 30 percent survived. Plantings in 1974 were of more hardy species with a better chance of becoming est-

ablished. About half the plants have been supplied by the Parks and Reserves Department of the Wellington City Council.

Mainly Australian species have been selected because of their toughness, but a few natives, including one or two totaras, are doing well. When cover has been obtained more native species will be planted.

It is not generally realised that the Bowen Hospital is registered as a charitable institution. The help given by local members is therefore greatly appreciated by the hospital.



[Gavin Dougherty photo

Wellington member Miss Isobel Eggers working near one of the wings of the new Bowen Hospital.

Norman Kirk memorial totara planting widely accepted

AUCKLAND Branch suggested to the Council of the Society last November that all local bodies should be asked if they would be prepared to arrange for the planting of three totara trees as a lasting tribute to the late Prime Minister, the Rt. Hon. Norman Kirk. The idea originated from a tribute paid by Mr M. Rata, Minister of Lands, shortly after Mr Kirk's death. He then said, "The great Totara has fallen".

More than 220 local bodies were asked if they would support the idea, and much enthusiasm has been shown for the proposal.

Local Bodies Agree

Almost every local body written to has agreed to plant the trees at some convenient time during this year. Some are providing commemorative plaques, and the Society's local branch representatives are being invited to take part in ceremonial plantings.

The widespread support for the scheme and the many complimentary remarks made about it in letters received have been gratifying. Some local bodies prefer planting native trees other than totaras and this change has been readily accepted.

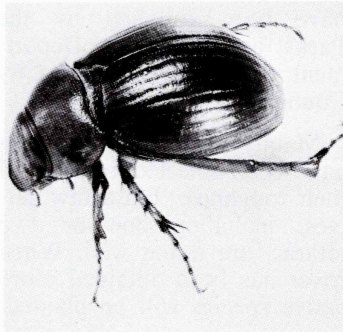
Branches are advised to check with their local bodies regarding the site and time for planting trees.

Unique New Zealand beetle near extinction

CROMWELL, in Central Otago, is the last refuge for a unique species of native beetle, *Prodontria lewisii* or the Cromwell chafer beetle. It is 14 mm long and flightless and was first identified in 1904, when it was widely distributed in deep sand in the then sparsely settled Cromwell area.

Today it is confined to a 1-acre vacant section near the heart of Cromwell where 17 adult specimens were found last year by Dr C. Watt and Mr J. S. Dugdale of the Entomology Division, Department of Scientific and Industrial Research, Mt. Albert, Auckland.

Dr Watt estimates that there could be about 100 adults left.



The Cromwell chafer beetle, which entomologists hope to save.

Residential land

The land which the chafer beetles inhabit is scheduled as residential, but even if it could be turned into a reserve, the native vegetation is likely to undergo modification and become unsuitable for the beetles.

Dr Watt believes the best chance of survival would be to transfer the colony to a reserve in the Cromwell area where conditions are right and native vegetation could be maintained. The most likely area is north-east of Cromwell golf course, where a reserve is proposed. The area contains sandhills, which the beetles require, and is suited to the growth of their food plants.

Feed on scabweed

The adults feed on scabweed, a prostrate daisy-like plant which forms cushions on the soil. They come out at night if conditions are favourable and hide by day in deep sand dunes. The larvae feed on the roots of native tussock.

If the proposed reserve is formed and provision made for the chafer beetle, the dual purpose would be served of conserving a species of insect found nowhere else in the world and of showing the natural vegetation of the unusual Cromwell sands.

BEQUESTS TO THE SOCIETY

The Society has received a number of bequests recently and you may wish to consider helping in this way to keep New Zealand beautiful.

Is there any cause more worthy of bequests by public-spirited citizens than the objectives of the Royal Forest and Bird Protection Society, which is working wholly and solely for the welfare of New Zealand, present and future? Here is a suggested form of bequest:



land, present and future? Here is a suggested form of bequest:

"I give and bequeath the sum of to the Royal Forest and Bird Protection Society of New Zealand (Incorporated) and I declare that the receipt of the secretary for the time being of the said Society shall be a complete discharge to my executors of the legacy hereby given to such Society."

Reports and notes from branches

WELLINGTON

A PARTY of 50 members of the Wellington Branch were privileged to have three well-known ornithologists—Drs C. A. Fleming and K. A. Wodzicki and Mr M. Falconer—accompany them on a trip in November to the Otaihanga side of the Waikanae River. Thirty members of the newly formed Kapiti Section of the branch also took part.

Dr Wodzicki published a paper on the birdlife of the estuary in 1946 and another jointly with Dr Fleming and Mr Falconer (regional representative of the New Zealand Ornithological Society) in 1973. All three over a long period have made a close study of the area, which has been described by Dr Wodzicki as "one of the few remaining places in the south of the North Island where a considerable number of native birds can be readily observed".

Since Sir William Buller first drew attention to the locality in 1878 there have been 50 species of native birds recorded there, including one kotuku (white heron), a regular winter visitor. Twenty-five species are "resident", the rest being migratory or occasional visitors.

Land has been zoned for reserve on the southern side of the estuary, and Wellington members think that this should be declared a wildlife refuge and if possible extended to preserve an adequate range of habitat for the varied bird species which frequent the area.

WANGANUI

ON a fine day in October a party from the Wanganui Branch made a trip to Mr Gordon's rhododendron gardens at Mataroa, near Taihape.

Mr Gordon met our bus some miles from his home and escorted us to the homestead in his station wagon. When we left the bus he kindly carried all our gear in his vehicle and allowed us to stroll around unhampered.

Mr Gordon has planted many species of trees mainly to arrest a large acreage of sloping hillside



Dr C. A. Fleming describes the movements of the many bird species around the Waikanae estuary. Kapiti Island is in the background.



Mr Falconer, regional representative of the Ornithological Society, and members of the party examine an injured bird.

[E. Lennie photos]

from overwhelming the homestead. The Taihape district is well known for this type of problem, and both the railway and main highway have always been subject to damage from huge creeping slips. In recent years much work has been done to stabilise the hill-sides. On our way to Mataroa, we had an impressive view of hillside plantings of poplars—all immaculately spaced and in a delicate shade of green leaves that

blended with the shade of the pastures.

After being escorted around their spacious grounds by both Mr and Mrs Gordon we enjoyed lunch in a beautiful setting of rhododendrons of many shades, and the miscellany of trees from many lands all seemed to have a particular shade of green of their own.

Spring in the Taihape district, is notable for its colourful display

of flowering kowhais. Probably no district anywhere else in New Zealand can outdo this display.

Mr Gordon escorted our bus from Mataroa over the Rangitikei River into the Kawhatau Valley, where we visited the home of his twin brother.

This farm was fairly close to the Ruahine Ranges, and several snowfalls had occurred in this area during the winter and spring. The grounds were beautifully kept, and well landscaped, and are visited periodically by busloads of tourists from many lands, sure proof that nature lovers the world over get great satisfaction from sharing this beauty with others.

—P. A. Prichard

A five-headed lancewood

FEBRUARY issue's article about the many-headed nikau growing in the Kauaeranga Valley interested me.

One of my favourite native trees is the lancewood, so easy to pick out in the bush and reminiscent, for me, of bush walks and eager children.

Only recently have we come to live in Wellington, and, one of the trees on our section, a lancewood, was tall and waving, but far too close to the house, scratching the wall and eaves badly in the northerly wind and disturbing our sleep.

We finally decided reluctantly that we would have to take it out. It still had its juvenile foliage. Loath to dig it out, one day I simply cut it off short, at about 3 ft.

Its unhappy stump gave me a twinge of conscience for a few weeks, but still I postponed the day when I would dig it right out. Then to my joy I noticed it sprouting. It was a surprise to me, but now one of my small prides is my five-headed lancewood.

Since then I have visited a friend with a romping sort of garden and a tumbling section of native bush. But at the edge of a lawn grows a most unwieldy lancewood, which in a boisterous wind hits the clothesline. Recounting my little story has saved it and like mine it is now pruned and given a new lease of life.

—Fay Clayton.

Notable trees in urban areas can be preserved

MINISTRY of Works and Development recently issued a bulletin entitled, "Preservation of Trees and Bush within Urban Areas". The Town and Country Planning Division of the Ministry wants local bodies to make landscape analyses before they prepare district schemes so that bush and tree areas can be preserved. It also wants councils to formulate appropriate objectives and policies for the protection of significant landscape features and to develop more sensitive planning techniques for controlling development within areas of bush and trees.

As a result of the Municipal Corporation Amendment Act 1974 councils can require plantings of trees and shrubs and the preservation of the natural landscape, trees, or areas of bush and trees.

Many councils have prepared, or are now preparing, lists of notable trees in their areas. Such trees can be legally protected under the Town and Country Planning Act 1953. Size or age is not the main requisite; one small tree may

be the only one in a large built-up area and it is therefore an extremely important part of the landscape. The Christchurch City Council has a register of some 150 trees (including groups), and this list covers only one-third of the metropolitan area.

The Forest Service has also prepared a list of about 300 notable trees of national importance. Many of the trees listed are in country areas. The list was originally compiled with the help of the Forest Research Institute, but anyone wishing to catalogue a tree can write to the Service, giving information of a particular tree and requesting its inclusion in the list. The list is obtainable from the Forest Service, Private Bag, Wellington.

No council, however willing, can act in ignorance, and if any members feel that there is a tree or group of trees worth protection in their areas, they should tell their local body and press for recognition of its status. Once the bulldozers move in, it is probably too late.

— Gill Watkin

BOOK REVIEW

"Ferns and Fern Allies in New Zealand":

Eric Heath and R. J. Chinnock

THE need for an illustrated book in colour about ferns has long been recognised, but until now no one has apparently attempted to produce one. This may be attributed, partly, to the lack of artists with the interest, time, and ability to produce such a book.

Eric Heath has now filled this long-felt need with his meticulously detailed illustrations. The text, written by botanist Bob Chinnock, is descriptive and technically sound.

The section on the cultivation and propagation of ferns and fern

allies should meet with support.

My only criticism is that the one illustration of the silver fern is not incorporated in the book itself, but appears on the dust jacket, and dust jackets tend to be somewhat impermanent.

I am sure that this book will prove a source of information and pleasure to all who are interested in ferns. Perhaps it may encourage others lovers of nature to delve deeper into this most interesting study.

—I.S.

A. H. and A. W. Reed Ltd. \$4.95.

Wellington party traverses both Wangapeka and Heaphy Tracks

SIX members of the Wellington Branch formed a private party in the Christmas holidays to tramp the Wangapeka and Heaphy Tracks, in the north of the South Island.

WE started from Wellington on 27 December and reached Tadmor, the nearest habitation to the Wangapeka Track, at dusk. Camp that night was near Rolling River, the true start of the track.

Though the tramping schedule for the next Saturday was tight, we stopped to talk to Mr King, of Old King's Hut, who still prospects for gold nearby, and arrived late at Stone Hut, the only hut on the Wangapeka where we met fellow trampers.

Next morning we were fortunate to see a morepork perching on a branch of an old black beech just above the track. He was quite happy to sit there and be photographed and flew away only after we had passed.

At lunch we were visited by friendly fantails and South Island robins. That night was spent at Helicopter Flat Hut.

The next Monday we tramped to Stag Hut, which is on the Tadmor side of the Little Wanganui Saddle and about 3000 ft up the 3565 ft saddle, the highest point of the track, and arrived in time to catch freshwater crayfish for tea.

The last day of the year was spent tramping over the saddle and down to "Belltown" in pouring rain, which prevented any view from the saddle that day. Belltown is named after the bell tents in which the prospectors of the area lived. From there it is a morning's walk along river flats, on an

excellently marked track, to the road.

On the road to Karamea we studied the unusual rock formations and fossils in the cliff side.

During two days in Karamea we discussed with the local inhabitants their views on the proposed Heaphy Road. Nearly all felt as we did—that there should be no road. Many entries in the logbooks along the track also supported us.

On to the Heaphy

We tramped to Scot's Beach on the the first night of the Heaphy Track part of the trip and started next morning on the beach walk to Heaphy Hut. Fortunately there was a sea mist which sheltered us from most of the sun's glare. That night we camped above the Heaphy Hut.

The track was very different from the Wangapeka. Much of the bush on the first day was subtropical (particularly nikau palms) and we were meeting many people, especially around the huts; more than half of them seemed to be overseas students.

On the second day we reached James MacKay Hut. The bush in this area is very attractive and we were heartened to see many young rimus. There was a fernbird at Lewis Hut, where we had lunch. It was only 25 yd from us and we were able to sit quietly and study it for 20 minutes.

The next day's walk to Goulard Downs Hut was exhausting. It proved to us even more than before how extraordinarily long the Forest Service miles are!

The downs are most impressive and filled with fascinating flora. A Wellington Botanical Society survey counted over 468 species. There are also many large caves, in some of which are glowworms and native bats. One of the caves we explored penetrated 200 ft into the hillside. So interesting were the downs that we stayed a second night and wished for longer. Even the hut was unique with drawings of early explorers on the walls.

The track to Perry Saddle through Goulard Downs scenic reserve was profusely flanked with subalpine orchids, hebes, and tussock grasses.

The hut was full that night and we met many interesting people, including one group who had started from Anatori River and come through the MacKay Downs to Perry Hut. This led them over much of the route proposed for the road, including the top of a razorback ridge, which they estimated would have to be dropped 200 ft to get even a bicycle track along it. At one stage they had gone for 14 hours without water.

Most of the huts attracted delightfully tame keas and wekas that will even feed from the hand.

Next day we reached Browns Hut (the end of the track) after passing through spectacular and beautiful beech forests.

The next Friday we enjoyed a trip to Farewell Spit, photographing oystercatchers, shags, banded dotterels, black-backed

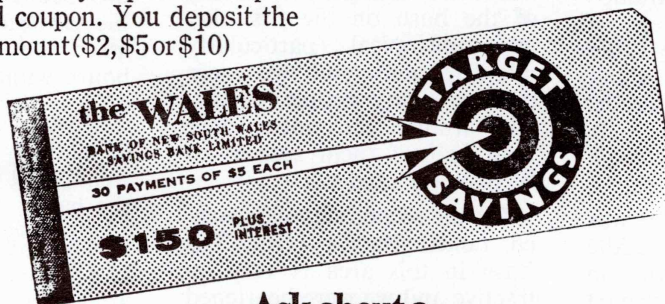


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gulls, gannets, and godwits on the way to and from the light-house. The godwits gather at the spit to migrate to Siberia.

At last came the time to leave and we were all sorry our holiday had ended. Thanks go to leader Eric Lennie for an enjoyable and interesting trip.

All reasonably fit people should find the tramping of the Wangapeka and Heaphy Tracks a worthwhile experience. Those who cannot undertake the entire tramp would be well advised to visit even the ends of both tracks.

—Helen Raymond

Summer campers look over Nelson district

LAST summer's camp, organised by the Nelson Branch and held at Stoke from 11 to 18 January, attracted 50 members, eight branches being represented. The organiser, Mr Jim Martin, assisted by his wife, ensured that members spent a happy and informative week.

AFTER a Sunday morning religious service, some campers visited Isel Park, which contains the oldest mixed stand of conifers in New Zealand, at least seven trees being known to be the biggest of their species in New Zealand. The park was once part of the property of Thomas Marsden, who came to Nelson at its foundation in 1842.

Some fine specimens he or his son planted—oak, beech, hornbeam, tulip tree, Canary Island pine, Tory pine, Douglas fir, and araucaria—are among the first grown in New Zealand. In the grounds of Broadgreen, a two-storey cob house built in 1855, there is a Spanish oak tree reputed to be the biggest in the Southern Hemisphere.

The Tuesday was spent at Rabbit Island relaxing, swimming, walking, or shell finding. The forest of radiata pine there is a fruitful source of income for the Waimea County, as several harvests have already been gathered. No shop may be opened on the

island, and no dogs are allowed, so that the miles of lovely beach with gentle incline are virtually unsullied. Oyster-catchers were busy on the wet sand, and a few herons were observed.

Trip to Lake Rotoiti

Wednesday was the day of the most important event—a trip to Lake Rotoiti. This was made more interesting by our returning by a different route from that of the outward journey; we thus saw extensive views from the Hope Saddle, then a part of the old railway route to Glenhope, and from the Tophouse road we looked over further expanses of natural and planted forest.

Rotoiti Lodge, built by voluntary labour and administered by the Department of Lands and Survey, is used by educational groups, especially parties of secondary school students.

Thursday's excursion was a bus tour of Nelson and its environs. At the port we saw

a chip mill in action; beech chips were kept in separate piles from pine chips before export.

That evening our speaker, Mr E. Ensor, senior forester, explained that hardwood chips, like beech, were now in demand in Japan because they produced better quality paper and better side-products. As beech, however, took 80 years to come to maturity, the culling was done discriminatingly. Nelson's exotic forests were the second largest in New Zealand. He said that deer were under reasonable control at present, but goats and opossums abounded; plentiful distribution of poisoned carrots was being tried in one area to kill opossums.

On a bus trip on Friday to the head of the Riwaka River we walked a short distance to the cavern in which the river has its source. In 1963 scuba divers found that this cavern probes 180 ft into the hill. On a nature walk, which took us past many rimus, matais, and kahikateas, as well as silver, red, and black beeches, we were especially delighted with the numerous clumps of crepe fern (*Todea hymenophylla*).

Other evening speakers were: Mr B. Dickinson, "Early Nelson"; Mr H. Hoskin, "Reserves and National Parks"; Mr Frank Alack, "Antarctica"; Mr J. Martin, native bird films.

By 10.30 a.m. on the last Saturday, the campers had dispersed. It had been a grand week for making and renewing friendships, for appreciating this part of our lovely land, and for feeling more keenly than ever the worth of the Society.

—Daphne McRae

Studying living things in grassland

TO UNDERSTAND bush and birdlife we need to look at all the living things in a place, the place itself, and the things that affect them. The seasons, the climate, the living soil, the plants, and the animals, including the birds, need to be looked at as a whole for understanding.

NATIVE plants and animals now have to share this country with a host of introduced living things, including man, in large numbers. Many native bird species have not been able to survive in the struggle. If we wish to help the survivors, we must try to understand why the bush and some native plants and birds are still waging a losing battle with man. We must make a wide study of all forms of life in the places where they live, and the best place to do this is our home.

Look first at your own home surroundings, the places you know best: your lawn, garden, or farm and the things that live there. Collecting dead animals and plants is not good enough. Look at the living things.

What makes a grassland?

What are the things that affect the plants and animals living in and on your lawn or home paddock?

They are sunlight (the light and heat energy given); weather (sunshine, rain, wind, cloud, frost, and air pressure); the living soil with its inhabitants; the plants and animals, including birds; the farm ani-

mals, your pets, and your family—man.

The living things of any area are called a **community**.

We have studied the sun, seasons, and weather in the last two issues. Let us look at the members of your grassland community.

Soil

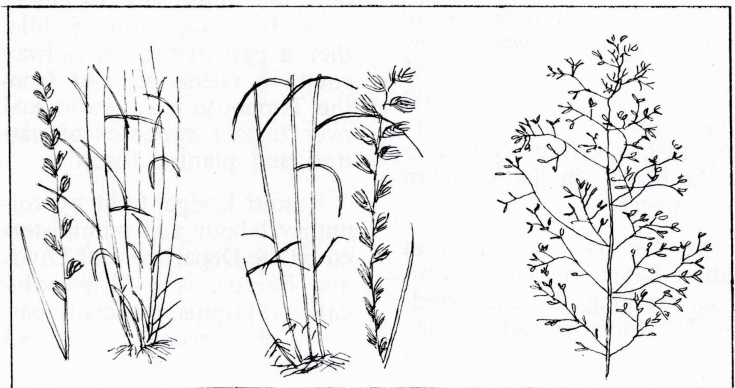
Most people think of soil as dirt, the stuff that Mum has to wash out of your clothes and clean out of the house. We speak of soiled hands and dirty clothes, yet the good earth is the source of all our food. It nourishes the plants for Dad to grow in his paddocks if he is a farmer or in his garden if he is a gardener. From these plants we get

bread, fruit, and vegetables, and from grasses and clovers we get milk, butter, cheese, meat, and wool.

The soil is made from rocks worn down by wind, rain, frost, ice, snow, and the waves of the sea. The gases in the air, oxygen and carbon dioxide, help to soften and break down the minerals in the rock. Materials are ground and broken into particles as coarse as gravel and as fine as clay or glacial flour (loess). Minerals are turned into oxides and carbonates that are more soluble in soil water. All these particles are the basis of soil whether it is sand, silt, or clay. The making of the particles from rock is called **weathering**.

When man interferes with the natural processes of weath-

By Roger Chorlton



Some well-known grasses. Left—perennial ryegrass, showing seed head and plant. Middle—Italian ryegrass, which has longer awns on the seed head than perennial ryegrass. Right—browntop.

* Sponsored by the J. R. McKenzie Trust.

ering by felling and burning bush, bulldozing hills for houses and roads, damming rivers, and overgrazing steep hills, we can have soil erosion. This speeded-up weathering washes the soil off the hills and chokes the valleys; it makes mountain ranges into barren, moving scree; it destroys trees and washes away roads and bridges; it can flood you out of your home. The fight against soil erosion is everybody's fight.

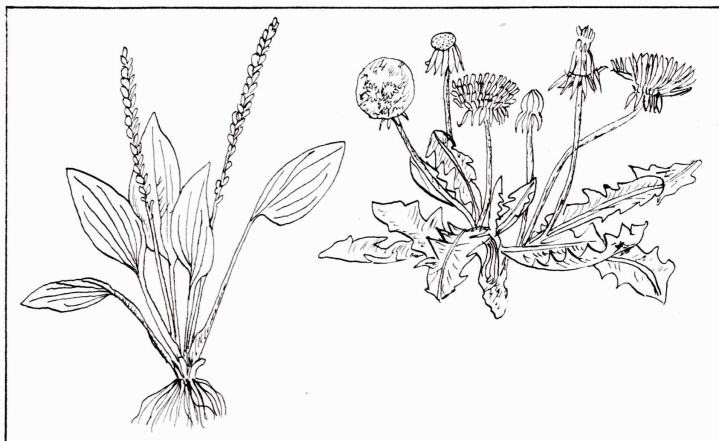
Why do we speak of the living soil? We all know that rock fragments are not alive, but few plants can grow in a soil made up of rock particles alone. We call such places deserts. Everything that has passed through a living organism and the remains of dead organisms go back into the soil and provide an enrichment of chemical elements that plants, and later animals, can use again. This material is called **humus**; it holds air and chemical elements in a form plants can use. Desert soils have plenty of air and rock particles, but little else — little water or organic matter (humus).

Dead and used material is used over again.

Decay organisms

Would the dead and waste matter decay and improve the soil by itself? The answer is no. All the dead plants and animals and their wastes would lie on the earth's surface until they dried up. What a mountain of material that would be! Then all the animals, including man, would die and finally nearly all the plants. The chemical elements needed by the plants would remain locked up in the wastes.

Rapid decay of dead and waste material is brought about



Flat weeds. Left—broad-leaved plantain. Right—dandelion.

by living organisms in the soil. They include earthworms, insects, mites, spiders, woodlice, centipedes and, most important, bacteria and fungi. Bacteria are so small that millions could live on a pin head. You can't see them unless you use a microscope. Bacteria and fungi are primitive plants.

They use some of the material for food and turn the rest into humus if conditions of drainage, temperature, and air are suitable.

Humus is a rather wonderful dark, spongy material that retains enough water for plant roots and also the vital elements in a form plants can use. It does not release them easily to drainage water waste. It holds enough air for plant roots requirements too.

You can see from the diagram on the next page how plants, animals, and soil organisms share in a never-ending cycle (circle) in a healthy soil. This is why we call it the "living soil".

Things to do

1. Take a spadeful of soil from
 - (a) a dry, hard clay bank

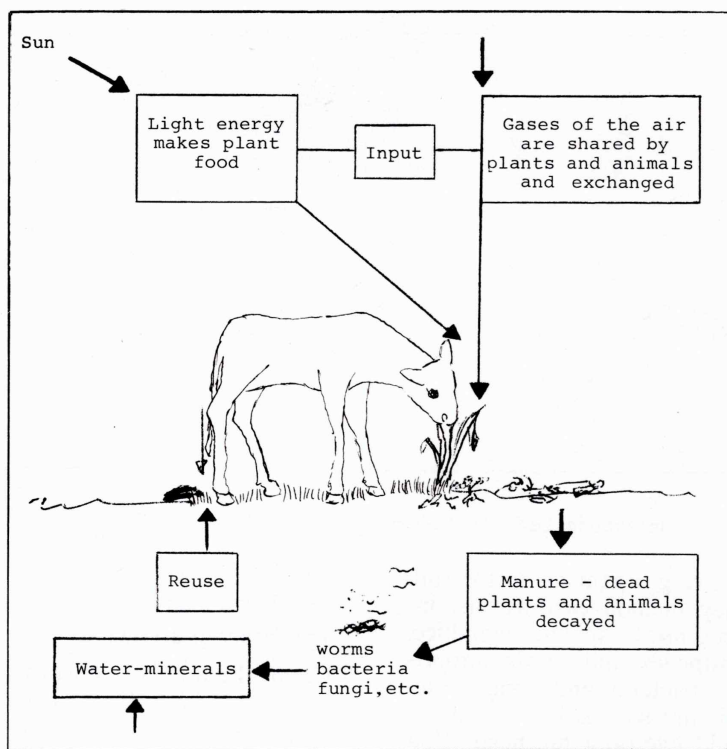
- (b) a moist paddock or lawn, and
- (c) beneath a cowpat

Count the number of worms you can find from each place. What do you conclude is the best soil and why?

2. Take a handful of litter—dead grass, leaves, and clover—from a lawn left to grow long or a thickly grassed paddock. Use a Berlese funnel to find the living inhabitants as described by Mrs Beu in the next article. How many different soil animals can you find?

Plants

The plants in a grassland are mainly grasses, clovers, and allied plants, and flat weeds. On lawns we have mainly the ryegrasses, chewings fescue, browntop, and *Poa pratensis*, with white clover and flat weeds like dandelion, plantain, and catsear. In paddocks you may find ryegrasses, white clover, red clover, and in the north, paspalum and kikuyu. On hills browntop, crested dogstail, and *Danthonia*



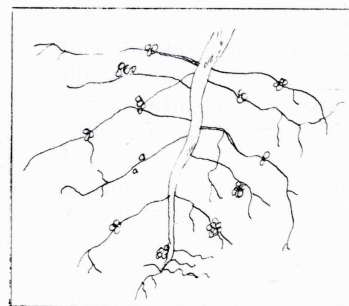
Nature uses what we call waste.

ules. These are the homes of millions of bacteria of a special kind. Unlike the decay bacteria, they get their nitrates from the nitrogen gas in the soil air. They are some of the few living things that can do this.

Green plants use the carbon dioxide gas of the air to obtain carbon for making starch. The oxygen gas for "burning" the sugar formed from the starch is used to obtain energy for growth. The green plants get their nitrates from the soil and the nodule bacteria supply more. Plants with such nodules are called **legumes**. Kowhai and gorse are further examples of legumes.

In exchange for the nitrates provided by the bacteria on their roots the legumes supply plant sugar to the bacteria. This sharing by living things is called **symbiosis** (living together). It is most important as a cheap supply of nitrate fertiliser for farmers. The soil itself is improved with nitrates. This is why gardeners grow beans, peas, and lupin to help their soil after green and root crops have been taken.

Some plants with three rounded leaflets are not clovers. An example is oxalis, some kinds of which are bad weeds in gardens.



Nodules on clover roots

Nodules on clover roots.

are common, and in many wet places Yorkshire fog and rushes can thrive. Some of these are illustrated here to help you name them. Use one of the books mentioned at the end of this article if you have

difficulty in naming other species.

The clovers are the plants with three rounded leaflets. They have little knot-like swellings on their roots called **nod-**

How to recognise some grassland plants

Name	Habit	Special features
Perennial ryegrass	Tufted	Red basal sheath; leaves dull above and glossy below
Italian ryegrass	Tufted	Red basal sheath; edge of leaves rough; longer awns than perennial ryegrass has
Browntop	Creeping stems both above and below ground	Rough leaf edges; (test on your tongue)
White clover	Creeping and rooting stems; leaflets heart-shaped, often marked; flowers white to pinkish; whole plant hairless	

Things to do

1. Dig up a clover or bean or pea plant (but ask the gardener's permission first). Look for the nodules about the size of a match head on

the roots. If there are no nodules, they will not grow well.

2. How many different kinds of grass and clover can you find in your lawn or paddock?

Reference books

Helpful books for reference are "Pasture Plants and Pastures of New Zealand" and "Weeds of New Zealand". Both are by F. W. Hilgendorf.

Collecting animals from plant litter

By Joan Beu

HAVE you ever wondered what lives in the litter of fallen and rotting leaves of a grassland? Well, one way to find out is to use a Berlese funnel, which can be built out of a variety of odds and ends.

I WILL describe the Berlese funnel that I have used, but all sorts of improvisations can be made. The bottom of a wooden box (as shown in the diagram below) is replaced by a piece of medium mesh wire (about $\frac{1}{2}$ cm). (A 4-gallon tin could be used instead of a box.) Below this is a metal funnel (made from a large tin). The top of the box has a close-fitting lid with several gauze-covered ventilation holes

and a light socket fitted in the centre. Get Dad to make the fitting for you. You may be able to use a bedside lamp, but don't try to do any electrical work on your own.

Wooden legs are fitted to the box so that the end of the funnel is just above a tall wide-necked jar (such as a preserving jar or a beaker).

A handful or two of leaf litter is laid on the wire mesh, the lid of the box closed, and

the light turned on and left on for about 24 hours. As the warmth from the light dries out the surface leaf litter the animal life moves down into the moister areas and finally moves through the mesh and slides down into the collecting jar.

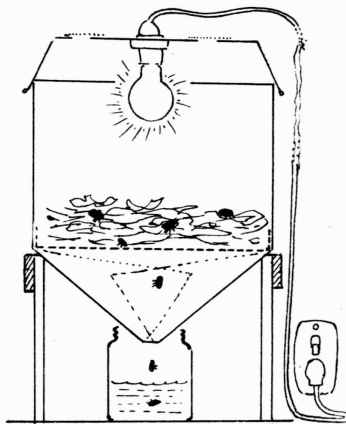
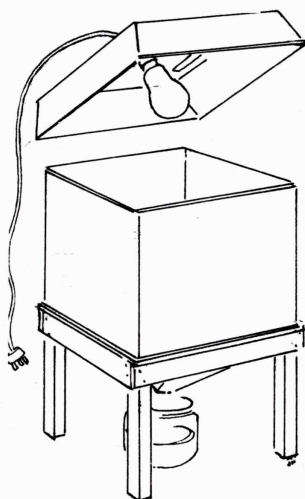
It takes a little practice to find the right heating times and temperatures to get a good result, and experience in selecting animal-rich types of leaf litter.

You will find a great deal of variation in the fauna collected from different types of leaf litter. One sample that I have seen from a Canterbury beech forest had very little else but mites in it, but there were hundreds of them in all shapes and sizes.

Another sample that I collected from among alpine tussock in Otago contained a number of species of small spiders.

This is not a good method for collecting snails, because they withdraw into their shells instead of crawling down through the mesh, though some do get jostled through.

Happy hunting, and let us know your results.



A Berlese funnel, which forces animal life in litter to move into a collecting jar beneath for examination.

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The reserve has interesting bush walks, and native birds are numerous. The round track is a comfortable 4 hours' walk, and as this is in its formative state, visitors are requested to keep to the marked track route.

The lodge is fully equipped and accommodates eight or nine people. It has a lounge, kitchen, two bunkrooms with innerspring mattresses and foam rubber pillows, washroom with tub, basin, and shower, and an ablution block with toilets, basins, and showers. Charges are moderate, as shown below.

The cooking facilities in the modern kitchen are excellent.

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Bookings are accepted up to 9 months in advance. No refunds are made unless cancellation is advised at least 1 month before reserved occupancy.

Rates per night are:

Members—adults, \$2; juniors, \$1.

Non-members—adults, \$3; juniors, \$1.50.

A deposit of 50 percent is to be made with each booking.

For free brochure and all bookings apply to Mrs F. B. Bennett, Papatowai, R. D. Owaka. Telephone 160M.

Turner Cottage

The Turner Cottage, on Stewart Island, is available for renting. The cottage, a one-roomed dwelling furnished for three people, can be obtained at a rental of \$2.50 a day.

For details write, enclosing a stamped addressed envelope, to:

The secretary, Southland Section, P.O. Box 1155, Invercargill.

Bushy Park, Kai Iwi

(15 miles north of Wanganui)

Fine old homestead, lovely grounds, 220 acres of native bush.

Make your own programme. Electric stove, hot water, and other facilities available. Bring your own rations and bedding.

Fees: Members, \$2.50 per night; non-members, \$3.50 per night; children under 15, half rates.

Custodian: C/o Bushy Park homestead, post office, Kai Iwi, via Wanganui. Telephone 49-734 Wanganui.

The park is closed to daytime visitors on Mondays and Tuesdays.

Ruapehu Lodge

Ruapehu Lodge is available to members and guests for occupation. To avoid double booking all bookings must be made with the Society's head office, P.O. Box 631, Wellington.

Fees: Winter season (1 June to 31 October), \$2.50 per night for all persons of all ages.

Summer season (1 November to 31 May), adult members, \$2; junior members, \$1; non-member guests, all ages, \$2.50.

Bookings: Bookings may be made by members, sections, and branches 9 months in advance.

A deposit of 20 percent (50c per person per night) is payable on application and the remainder within 6 weeks of the date of the trip.

If bookings are not confirmed by the due date, the space may be relet.

Refunds are subject to \$10 surcharge.

The deposit receipt will be returned with an instructions sheet listing suggested equipment which should be taken on the trip: Tea-towel, torch, sleeping bag, blankets, sheets, and slippers or light shoes. A pillow case is essential.

The wearing of boots inside the lodge is not permitted. No animals or pets are allowed in the park.

Any person occupying the lodge without prior booking must immediately remit the proper fees to the booking officer.

Waiheke Island Cottage, Onetangi

The cottage has comfortable bunk accommodation for eight people and has electric lighting, stove, refrigerator, and hot water. Adjacent to a 121-acre wildlife reserve, it is an easy walk to shops and the beach. It is reached by ferry from Auckland City (two or three return trips daily) and by bus or taxi from the island ferry wharf. Everything is supplied except linen and food.

No animals permitted.

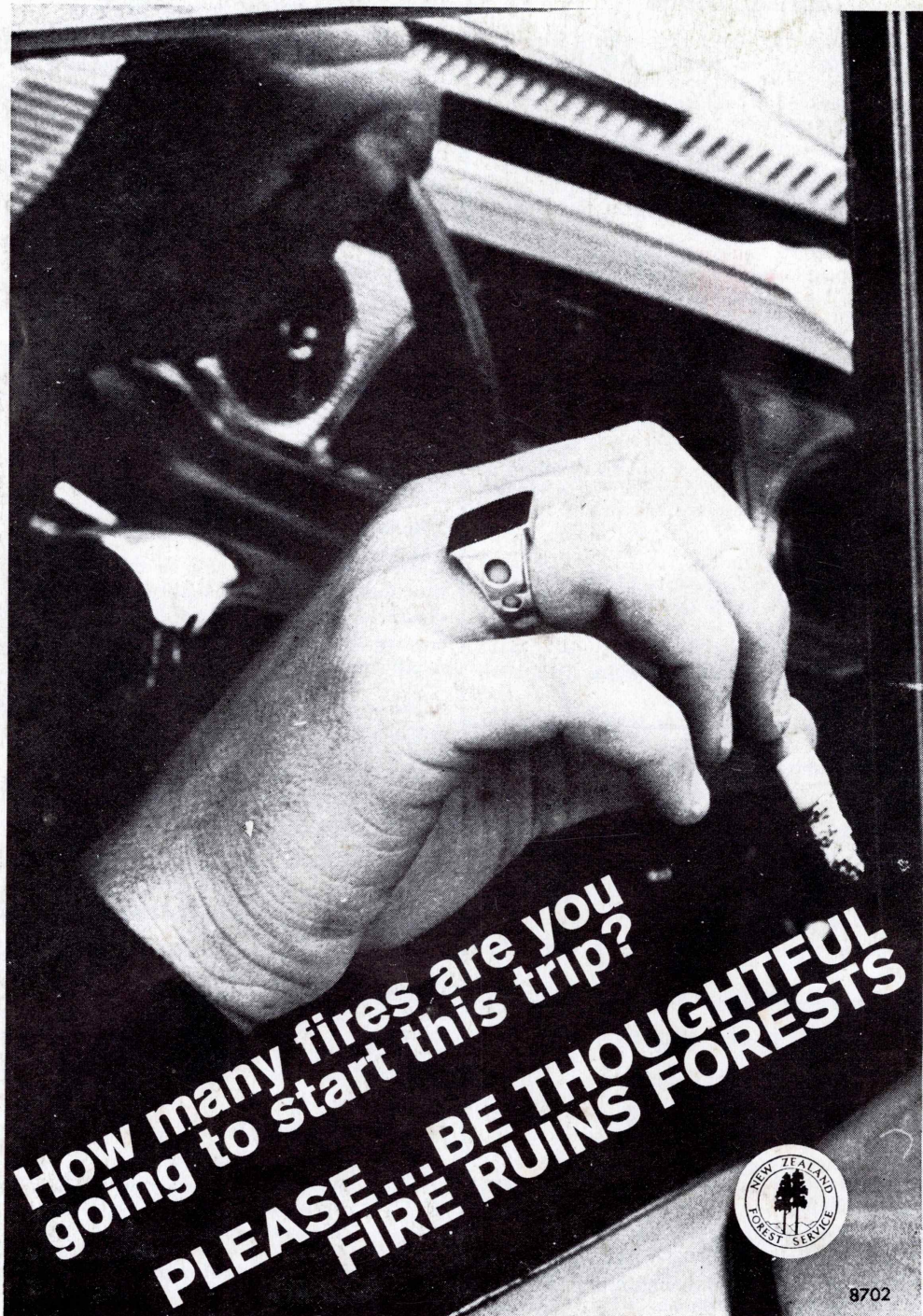
Rental: Summer, \$21 per week.

Winter (after Easter to mid-October), \$15 per week.

Weekends only, \$9.

A deposit of 50 percent is payable on booking, the remainder before entry.

Booking Officer: Mr K. A. Lake, 40 Kildare Avenue, St Heliers, Auckland 4. Telephone 558-859.



How many fires are you
going to start this trip?
**PLEASE... BE THOUGHTFUL
FIRE RUINS FORESTS**



8702

ROYAL FOREST AND BIRD PROTECTION SOCIETY OF
NEW ZEALAND, INC.,

ANNUAL REPORT

FOR THE YEAR ENDING FEBRUARY 28th, 1975, BEING THE
FIFTY-SECOND YEAR OF THE SOCIETY

To be presented at the Annual General Meeting to be held in Wool House,
Featherston Street, Wellington, at 9.30am on Saturday, 21st June, 1975

ORGANISATION

The Society's Executive has pleasure in presenting the Annual Report and Statement of Accounts for the year ended 28th February, 1975, and records the increased membership at just under 18,000.

While there have been some losses due to moving population, death and other causes, there has been little change resulting from the increased subscription rates, but it is noted that the Senior Citizen membership is proving popular.

We commend the initiative of the Auckland and Wellington Branches in establishing new Sections in South Auckland, Kapiti and Mana.

The Council, comprising 28 members under the newly-adopted Constitution, held two meetings during the year, at Palmerston North and Bushy Park respectively, while the Executive met on 13 occasions. In addition, the Finance Sub-Committee and other Sub-Committees held a total of 25 meetings during the year.

There are 25 branches, with every likelihood of new branches being formed on the West Coast and in Northland. The President is making strenuous efforts to visit all branches to meet members and to study local environmental issues.

ADMINISTRATION

Perhaps the most important item under this heading has been the registration and printing of the new Constitution after re-writing in the terms of the decisions reached at the Annual Meeting.

The Headquarters of the Society has since 1931 been in the "Evening Post" building, and we pay tribute to the assistance of the Blundell brothers over those years. However, for some time it had been apparent that a change was necessary to meet the growing need for adequate office space. In November, 1974, we moved to the Phoenix Insurance Building, 292 Lambton Quay, near Cable Car Lane, and now occupy the entire top floor.

The complete change in our subscription procedures whereby all subscription accounts are sent out in August each year instead of in four sections, February, May, August and November dependent on date of joining the Society, necessitated considerable work on the part of the office staff in adjusting these first accounts to bring all into line. In future the work of the office will be materially reduced by the changeover, and a better utilisation of office equipment will be ensured.

Following Mr Nelson's retirement after 19 years as President, he continued to give the Society most valuable assistance as Chairman of the Conservation Sub-Committee until his severe illness in

January, which necessitated two operations. We are thankful that Mr Nelson has made such a good recovery. He still manages to give us valuable help in various ways as Immediate Past-President with a seat on the Executive. Tributes continue to pour in as a testimony of the high esteem in which he is held.

With the newly-elected President resident in Taupo there were some difficulties from a "communication" point of view, but these, for the most part, have now been solved. The Deputy President, Mr A. A. Pascoe, has looked after day-to-day administrative matters and made himself available as required.

As envisaged in last year's report, Mr C. O. Field relinquished the position of Secretary to the Society on 31st March, 1974. Mrs Olga Langford was appointed to fill the vacancy. Mrs Vera Lawson resigned towards the end of the year, after giving some seven years' service in a part-time capacity. Increased membership necessitated the appointment of Miss Naomi Sorenson who, with Miss Vicki Moir as Receptionist-typist, makes up the office family, with some part-time clerical and typing assistance.

Mr Arthur Reeve assumed full-time duties on 1st April, 1974, and is engaged on special projects, public relations work and assistance to the Secretary on administrative matters as occasion arises.

BUILDING PROPOSAL

This project has advanced a step nearer with the investment of some \$120,000 in the purchase of a building site at 3-4 Kent Terrace, Wellington, as indicated to Council at Palmerston North last June.

FINANCE

The finances of the Society have undergone considerable changes during the year.

The disposal of securities to the value of some \$120,000 to meet the cost of the Kent Terrace building site, even though much of it was low-yield Local Authority stock, has meant a considerable reduction in Investment Income. The Endowment Fund of \$28,000 held by the Public Trust is now invested under mortgage in Kent Terrace. The Executive has thus seen fit to invest approximately half its funds in land on which are some old buildings which, however, under lease returns the Society over \$5,000 per annum, or three per cent, after meeting outgoings (rates, etc.).

The inaugurating of annual billing for subscriptions in August has improved the work flow in the office but can affect the liquidity position in the first half of the financial year (March-August), and this

must be allowed for if we are to avoid temporary bank accommodation. The increase in subscriptions from \$25,000 last year to almost \$40,000 reflects three factors — increased rates, increased membership and annual billing.

Another factor affecting the finances of the Society stems from the change in venue of our headquarters from the "Evening Post" building to Lambton Quay. The increase here will be from about \$1600 to over \$6000 in a full year — admittedly for much-needed and larger premises.

Apart from the continuing spiralling of costs, we particularly draw attention to payment of \$14,000 for the Bird Album reprint and mention the fact that the Society is holding upwards of 2000 copies for sale. The Ruapehu extensions have been completed at a cost of approximately \$5000. Travelling expenses have doubled as compared with last year, while salaries, at \$25,000 are more in harmony with the market than the conservative attitude of the past.

Bearing these factors in mind, the excess of Expenditure over Income, \$13,000 is understandable but must be countered. On the other hand, items not allowed for in that assessment are Legacies bequeathed to the Society for the purpose of carrying on the objects of the Society. During the year under review an amount of \$6960 has come to hand from the estates of the following donors: A. N. Thornton, A. H. Anthony, F. V. M. Woodham, R. S. Wiggins, H. A. Patullo and M. L. Newman.

In budgeting next year's revenue and expenses, every effort is being made to break even, but this can be done only with the active assistance of all members.

The response to the questionnaire relating to the establishment of a Headquarters Building following the purchase of the Kent Terrace site necessitated the setting-up of a Building Fund within the Society, and this now stands at \$61,529.

OBITUARY

Dr Gerald P. Fitzgerald, F.R.C.O.G. The Society lost a very valued and keen supporter in Dr Gerald Fitzgerald, who died at his home, Stoneleigh, Otago Peninsula, in August, 1974, at the age of 81 years. One of the ten Vice-Presidents of the Society, he had been a Life Member since 1942, and formed the Dunedin Section, which later became the Otago Branch.

Sir Gilbert Archey, C.B.E., F.R.S.N.Z. The death occurred in October 1974 of Sir Gilbert who for many years was a Vice President of the Society. He had been Director of the Auckland Museum and was an authority on the Moa. A man of great erudition whose knowledge of Polynesian history generally was unrivalled within New Zealand.

FORESTRY DEVELOPMENT CONFERENCE

The Forestry Development Conference, which opened its sessions in November last, is of monumental interest to the Society, since it will define Government policy with regard to indigenous forests for a long time to come. The first Conference set up various working parties, each concerned with some aspect of forestry —

land utilisation, water and soil conservation, legal aspects with regard to private land, and so on. The Society has been represented on most of these.

THE BEECH FOREST ISSUE

This has been a continuing effort on the part of your Executive and an investigating team, under the leadership of the President, visited the West Coast with the object of obtaining a better appreciation of the utilisation proposals, tenders for which close on 31st March, 1975. During the visit every assistance was given by members of the staff of the State Forest service.

Following the visit, representations were made to the Lands and Survey Department that an area of land between Murchison and Springs Junction be set aside as a Scenic Reserve. Advice is to hand that the area will be protected either as a Scenic Reserve or as State Forest.

WARAWARA KAURI FOREST

This area, since the 1960s, has occasioned considerable concern when a decision was made to permit milling. The shocking damage resulting from these operations resulted in proposals being made that the position be reviewed, milling eased out, and a Kauri Forest Sanctuary be formed. There have been no further logging operations since May, 1974. However, after consulting with conservation interests including our own Society, a permit has been granted to take battens and fencing materials from the heads left under very strict control and any funds arising from the sale of this produce will be used to assist the local marae.

Of the 564 hectares of dense kauri remaining some 210 hectares will be included in the proposed Warawara Kauri Forest Sanctuary. The remaining 354 hectares is being investigated as to the feasibility of inclusion in the proposed sanctuary and future management of cut-over areas will attempt to regenerate, either artificially or naturally, back to kauri.

EXPORT OF INDIGENOUS TIMBERS

Further representations were made concerning the export of indigenous timbers and a case put to Government for this to cease and for the cost of indigenous timbers to be so regulated as to make them more valuable than exotics for local use and thus remove the pressure of the building industry, etc. in wanting more of our indigenous forests felled.

NOXIOUS ANIMALS ACT

A review of the Noxious Animals Act took place last year, following our representations, and while there were some substantial improvements in the Regulations there were also some disturbing aspects, over which Government will have to exercise careful control. Individual approach by letter was made to all Members of Parliament seeking greater enforcement of the provisions of the Act.

OPOSSUMS ON KAPITI ISLAND SANCTUARY

The question of research on opossum stability in the Sanctuary is still being pursued, and the latest move is an invitation to the Executive to visit the Research Station in the Orongorongo.

ROYAL FOREST AND BIRD PROTECTION SOCIETY OF NEW ZEALAND
Income Statement for the Year ended 28 February, 1975.

	(1975)	(1974)
	\$	\$
<u>INCOME</u>		
Annual Subscriptions	39019	25722
Investment Income	8748	13443
Donations and Small Legacies	5593	2141
Administration Fees	1200	1100
Miscellaneous Income	538	545
Bird Album Sales	10004	
<u>Less Cost of Albums</u>	<u>7424</u>	
	2580	-
Rental Income	3031	
<u>Less Property expenses</u>	<u>1597</u>	
	1434	-
Excess of Expenditure over Income for the Year	12954	3906

**AUDITORS REPORT TO MEMBERS OF
ROYAL FOREST AND BIRD PROTECTION
SOCIETY OF NEW ZEALAND INC.**

We have examined the accounting records of the Society for the year ended 28 February, 1975. Our examination was confined to records kept by the Society at Head Office.

Subject to the above comment, in our opinion, and according to the best of our information and explanations given to us, the attached Balance Sheet, Income and Expenditure Account together with notes thereon are properly drawn up so as to exhibit, respectively, a true and fair view of the state of the Society's affairs as at 28 February, 1975 and of the Society's transactions for the year ended on that date.

David Markham & Co..
AUDITORS

WELLINGTON, N.Z.
7 May, 1975.

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ROYAL FOREST AND BIRD PROTECTION SOCIETY

Balance Sheet

	(1975) \$	(1974) \$
<u>GENERAL FUNDS (Note 1)</u>		
Endowment Fund	28053	28053
Reserve Maintenance Fund	50000	50000
Legacies Fund	59097	52774
Life Membership Fund	38308	33858
Open Country and Wetlands Bird Album Fund	11557	11557
Sanctuary Fund	9164	9164
Sanderson Sanctuary Fund	1095	1095
Moirs Cox Memorial Fund	213	213
	<u>197487</u>	<u>186714</u>
Less:		
Accumulated Deficit 1.3.1974	3180	(726)
Excess of Expenditure for year	<u>12954</u>	<u>3906</u>
Accumulated Deficit 28.2.75		<u>16134</u>
		<u>183534</u>
<u>TERM LIABILITY</u>		
Public Trustee Mortgage	26623	-
		<u>=====</u>
<u>CURRENT LIABILITIES</u>		
Accounts payable	4892	2325
Advance from Restricted Funds	33355	-
Pre-Publication Book Sales	<u>-</u>	<u>4428</u>
		<u>38247</u>
		<u>6753</u>
		<u>=====</u>
	<u>246223</u>	<u>190287</u>
<u>RESTRICTED FUNDS (Note 2)</u>		
Sutherland Trust Fund	35890	33672
Hastings & Havelock North Branch Funds	48206	36363
Building Fund	<u>61529</u>	<u>1478</u>
		<u>145625</u>
		<u>71513</u>
		<u>=====</u>
	<u>\$ 391848</u>	<u>\$ 261800</u>
	<u>=====</u>	<u>=====</u>

TION SOCIETY OF NEW ZEALAND

as at February 1975

			(1975) \$	(1974) \$
<u>FIXED ASSETS</u>				
	<u>Cost Price</u>	<u>Depreciation To Date</u>		
Property (Note 3)	121006	-	121006	-
Office Equipment	3065	1016	2049	2088
Library	74	-	74	74
	<u>124145</u>	<u>1016</u>	<u>123129</u>	<u>2162</u>
				=====
<u>LODGES (Note 4)</u>				
Ruapehu		10564		8615
Tautuku		<u>4287</u>		<u>4287</u>
			14851	12902
				=====
<u>INVESTMENTS</u>				
Public Trustee		26623		28053
Trustee Executors - mortgages		29260		29260
Shares in Public Companies (Market value \$22672)		19682		19682
Trustees Executors & Group Investment		-		10000
Bank Term Deposit		-		17740
Local Authority Stock		-		44800
United Discount Co,Ltd Commercial Bill		-		20000
		<u> </u>	75565	<u>169535</u>
				=====
<u>CURRENT ASSETS</u>				
A. & N.Z. Banking Group Ltd		23950		4697
United Discount Co.Ltd Term Deposit		1157		-
Accounts Receivable		1003		-
Stocks of Bird Albums		6568		-
Deferred Expenditure - Indigenous Forests Book		-		991
		<u> </u>	32678	<u>5688</u>
			246223	<u>190287</u>
<u>RESTRICTED ASSETS</u>				
Investments as per attached notes		112270		65090
Advances to the Society		33355		5238
Accounts Receivable		-		1185
		<u> </u>	145625	<u>71513</u>
				=====
			\$ 391848	\$ 261800
			=====	=====

ROYAL FOREST AND BIRD PROTECTION SOCIETY

Income and Expenditure Account for the year ended 31st December 1974

		(1975) \$	(1974) \$
<u>EXPENDITURE</u>			
<u>OFFICE EXPENSES</u>			
Rent, Light & Power	3023		1601
Postages & Telephone	2935		2017
Printing & Stationery	3818		1907
Depreciation of Office Equipment	485		374
General Office Expenses	785		300
		11046	6199
			=====
<u>ADMINISTRATION EXPENSES</u>			
Salaries	24954		14616
Travelling expenses - Secretary	60		132
- Executive	3621		2136
- I.C.B.P	804		-
- Special	226		-
Council Expenses	1308		400
Accountancy & Audit Fees	1590		915
Miscellaneous Expenses	120		239
		32683	18438
			=====
<u>RESERVES MAINTENANCE</u>			
Rates	356		293
General Maintenance	184		720
	540		1013
Bushy Park - expenses	6513		4353
Less - receipts	5279		3818
	1234		535
		1774	1548
			=====
<u>GENERAL EXPENSES</u>			
Journal Costs	11651		7779
Less - Revenue	1708		750
			=====
Publicity Costs	9943		7029
Grants to Organisation	18		80
Branch Allocations	1500		-
Insurance	3203		2660
Indigenous Forests Book	350		293
Indigenous Forests General	1802		-
Legal Expenses	1083		-
Miscellaneous	1365		111
Beech Forest Petition	2505		1557
Jubilee Costs	-		4403
	-		4539
		21769	20672
		4794	-
		72066	46857
		=====	=====
<u>LOSS ON REALISATION OF INVESTMENTS</u>			

(b) Reserve Maintenance Fund — \$50000 — A fund set aside to provide income to maintain the Society's reserves in perpetuity.

(c) Legacies Fund — \$59097 — A fund representing the accumulation of legacies in excess of \$500 received for the general purposes of the Society. Any legacies received under \$500 are treated as income of the Society in the year they are received.

(d) Life Membership Fund — \$38308 — A fund representing all life membership subscriptions received by the Society, the object being to provide the equivalent of an annual membership subscription from the investment of each life member's subscription.

(e) Open Country and Wetlands Bird Album Fund — \$11557 — A fund created from profits from sales of original bird albums, set aside to finance further publications.

(f) Sanctuary Fund — \$9164 — donations set aside for the acquisition of a bird sanctuary.

(g) Sanderson Sanctuary Fund — \$1095 — A fund set aside to provide a suitable memorial to the late Captain Sanderson.

(h) Moira Cox Memorial Fund — \$213 — A small fund to provide an annual memorial for a deceased prominent member of the Society.

2. Restricted Funds

These are vested in the Society for specific purposes and are not available to be used by the Society at its own discretion for its general objects.

(a) Sutherland Trust Fund — An endowment from the late Archibald Sutherland, from which to provide for the maintenance in perpetuity of bush left in the care of the Society by him.

	\$	Represented by:	\$
Original Capital	30832	Trustees Executors — Mortgages	30832
Accumulated Income to 28.2.75	5058	Advance to the Society	5058
	<u>35890</u>		<u>35890</u>

(b) Hastings and Havelock North Branch — Funds held in trust by the Society on behalf of its Hastings and Havelock North Branch for expenditure on the aims of the Society in the Hawkes Bay area.

	\$	Represented by:	\$
Masters Estate — Original Capital	32850	Trustees Executors — Mortgages	30850
Williams Estate — Original Capital	7330	N.Z. Insurance Co. Napier —	
Knapp Estate — Original Capital	2500	Group Investment	11500
Martyn Pharaohyn —		Advanced to the Society	5856
Original Capital	2000		
	<u>44680</u>		
Accumulated Income to 28.2.75	3526		
	<u>48206</u>		<u>48206</u>

(c) Building Fund — Donations and Loans received from members to finance a future building and offices for the Society.

	\$	Represented by:	\$
Donations	23568	A. & N.Z. Banking Group Ltd	37680
Loans	38185	Trustees Executors — Mortgages	1408
	<u>61753</u>	Advance to the Society	22441
Less Net Administration Costs	224		
	<u>61529</u>		<u>61529</u>

Loans amounting to \$38185 were made to the Society in response to an appeal made in November 1974 and are repayable in accordance with members' individual instructions. \$5400 could be repayable within 12 months and a further \$27500 is repayable within five years.

3. Property

\$121006 represents the cost to the Society of acquiring the land at 3 and 4 Kent Terrace in June 1974 with the intention of developing the site for new premises.

4. Lodges

There was a surplus of \$2863 (1974 — \$1731) on the operations of the Ruapehu Lodge during the year to 28th February 1975. As in previous years, any surplus on operations has been applied in reducing the balance of the Society's investments in the lodges. Details of these investments are as follows:

	Cost to Society	Contributions and Repayments	Balance of Investment as at 28.2.75
Ruapehu			
Building, Furniture and Equipment	27202	16638	10564
Tautuku			
Building, Furniture and Equipment	10619	6332	4287

INTERNATIONAL COUNCIL FOR BIRD PRESERVATION

The Society was represented at the XVI World Conference, held for the first time in Australasia, by Mr David Medway and Mr Brian A. Ellis, who delivered a paper, "Rare and Endangered New Zealand Birds".

Following the Conference, the Secretary-General, Miss Phyllis Barclay-Smith, C.B.E., was invited to New Zealand and travelled from Auckland to Wellington through the courtesy of various members or Branches. Miss Barclay-Smith addressed the Executive and presented Mr Nelson with an inscribed scroll recording the I.C.B.P.'s appreciation of his long and outstanding service.

SOCIETY LODGES AND RESERVES

Ruapehu Lodge continues to be an effective segment of our organisation for both the pleasure and the education of members and their families under the care and guidance of Mr P. F. Fagan. Extensions to the ablution facilities have been completed.

Bushy Park is growing in popularity under the custodianship of Mr and Mrs Roy Studd, who are endeavouring to bring back some of the old aura attaching to the homestead and its environs. Day visitors have totalled over 5000 and accommodation approximates 800 bed nights over the last six months. The new brochure ap-

pears to be well received — Become a "Friend of Bushy Park".

Tautuku: Improvements in layout of the site and entrance have been done by the Otago Branch, and the facilities to members are availed of to an increasing extent.

Turner Cottage and Waiheke Cottage are other facilities available to members and are administered by the Southland and Auckland Branches respectively.

ANNUAL CAMPS

The camp at Nelson, from 11th-18th January, arranged by the Nelson Branch and under the guidance of Mr J. K. Martin was very enjoyable.

SUPPORT OF MEMBERS

The level of donations and assistance from members in various ways has been most heartening to your Executive.

THANKS

We thank the news media for their valuable assistance and various Government Departments for their understanding of our many problems and their frank but friendly discussions.

Finally, we thank our Branch and Section Committees and all members for their continued support and hard work in the interests of the future of our beautiful New Zealand.

J. V. Jerram, President.

N. E. Dalmer, Member.

ROYAL FOREST AND BIRD PROTECTION SOCIETY OF NEW ZEALAND INC. SCHEDULE OF RESERVES as at 28 February, 1974

		Acreage
Blowhard Bush	Hawkes Bay	
	(Taihape/Napier Road)	156
Bushy Park	Kai Iwi, Wanganui	241
Ecclesfield Reserve	Silverstream, Wellington	11
Laird's Bush	Turakina Valley	18
Lenz Reserve	Tautuku, Otago	1360
MacPherson's Bush	Turakina Valley	23
Ngaheretuku	Clevedon	37
Percy Leonard Moore Reserve	Dunedin	11
Pharazyn Bush	Paraparaumu	9
Pryce's Rahui Bush	Hunterville	31
Rhodes Property	Lytelton	1/2
Simpson's Bush	Hunterville	4
Sutherland's Bush No 1	Turakina Valley	149
Sutherland's Bush No 2	Turakina Valley	29
Waiheke Island Bush	Onetangi	123
Waikanae Section	Waikanae	1/4
Walter Scott Reserve	Pirongia	106
Total Acreage		2297 ³ / ₄

SCHEDULE OF PROPERTIES as at 28 February, 1974

		Government Valuation
Bushy Park Homestead	Wanganui	11800
Turners Cottage	Halfmoon Bay	1100
Waiheke Cottage	Onetangi	2450
		\$15350

NOTES TO THE ACCOUNTS

1. General Funds

These are accumulated funds under the control of the society and available to be used for its general purposes and objects.

(a) Endowment Fund — \$28053 — Proceeds of "Lucky Bird" Art Union for aid in research work of the "preservation of desirable bird and forest life" and fostering interest by school children and the general public in these matters.

(Continued on Page 8)